

MODERN Machine Shop

January, 1948

Table of Contents
Page 5

PLATINUM LIBRARY

JAN 13 1948

DETROIT



Quietly
RUNNING FOR YEARS

ORMA-HOFFMANN BEARINGS CORP'N, STAMFORD, CONN., FOUNDED 1911

GORTON

*First Again with
the Finest...*

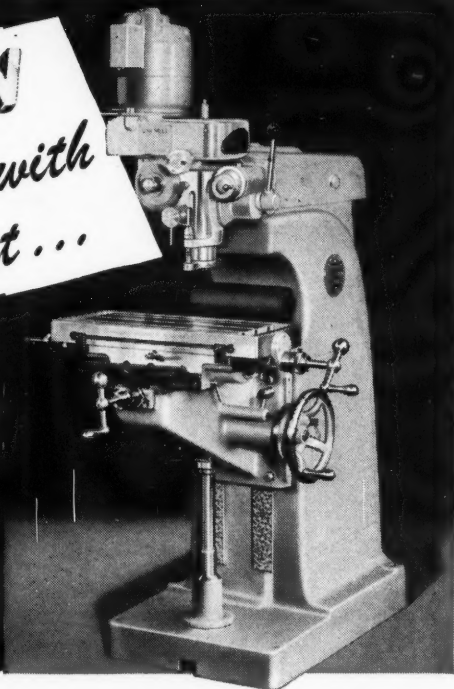
ANNOUNCING THE NEW O-16A SUPER-SPEED MILLING MACHINE

**Indispensable in the Tool Room
Machine Shop... Adaptable for Gen-
eral Engraving, Brass Routing, Die and
Mold Duplicating**

This new O-16A *Gorton Super-Speed mill in-
corporates all of the features necessary in an
"all purpose" machine. It will do a better
job for you on any work within the limits
of its size.

The Gorton O-16A is rugged. It is designed for
operator convenience and features extremely
sensitive table and saddle controls. Spindle
speeds from 500 to 10,000 R.P.M. available.
1/2 H.P. motor.

*Trade Mark Reg. U. S. Pat. Office

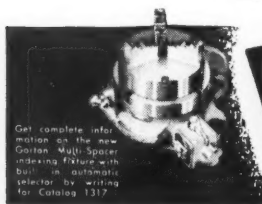


DESIGNED FOR VERSATILE DUTY— Check These Features

Heavy column, adjustable ram, super-speed spin-
dle permanently lubricated, swivel or universal
head, positive spindle brake, spindle lock, quill
lock, depth stop graduated in thousandths, mi-
crometer and lever feed on spindle.

Adaptable for...

... General engraving and brass routing by
using special extension spindle and foot treadle
attachments ... Die and mold duplicating
by adding tracer head and dupli-
cator table.



Get complete infor-
mation on the new
Gorton Multi-Spacer
indexing fixture with
built-in automatic
selector by writing
for Catalog 1317.

FREE

FREE

PLEASE SEND WITHOUT OBLIGATION
Bulletin No. 1655 - 1701

Name
Company
Position
Address
City State



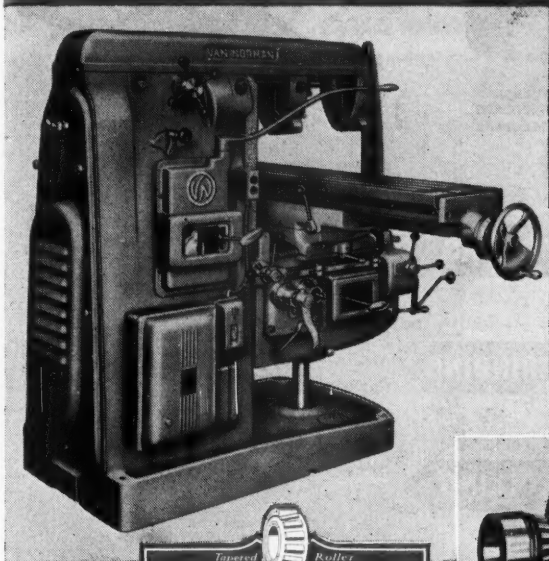
GEORGE GORTON MACHINE CO.

Tracer Controlled Milling

1701 RACINE STREET • RACINE, WISCONSIN, U. S. A.

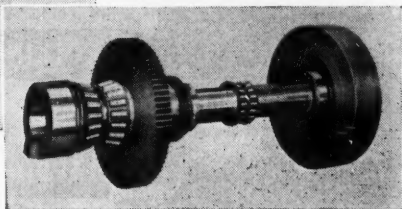
MILLING PRECISION

PUBLIC LIBRARY
JAN 18 1948
**VAN
NORMAN**



Van Norman No. 2 Heavy Milling Machine with Timken Bearings on the spindle and spindle drive transmission.

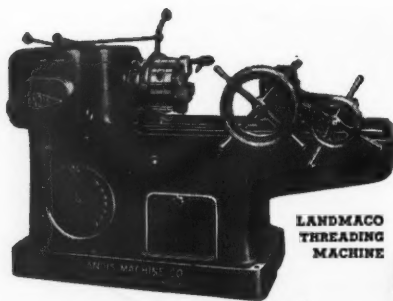
Van Norman No. 2 Milling Machine spindle showing multiple bearing mounting with 4 Timken Bearings.



The Van Norman Company's long-standing reputation for precision machining equipment is emphasized in their No. 2 Heavy Milling Machine pictured here.

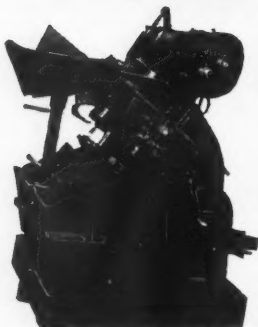
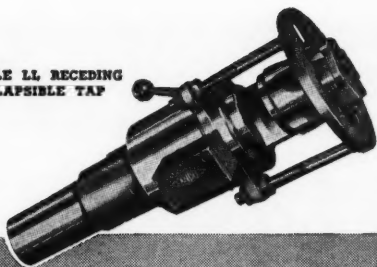
With sound modern design, high quality materials and accurate manufacture Timken Tapered Roller Bearings team up to assure the utmost in precision. Like so many other well-known machine tool builders, Van Norman realizes that precision pays off at the spindle nose and that Timken Bearings assure rigid spindles free from chatter at any speed, feed and cutting load. Make sure you have them on your machine spindles. Look for the trade-mark "TIMKEN" on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio.





LANDMACO
THREADING
MACHINE

STYLE LL RECEDING
COLLAPSIBLE TAP



AUTOMATIC FORMING
& THREADING

CUTTING

GRINDING

ROLLING

TAPPING

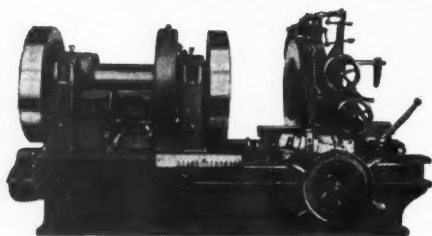
BETTER ^{by} THREADS LANDIS METHODS

The LANDIS LINE, offering equipment designed to perform many types of threading operations, has a world-wide reputation for precision accuracy and high-speed production.

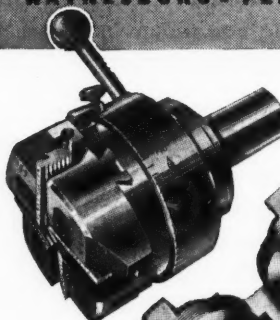
LANDIS
MACHINE
COMPANY
WAYNESBORO • PENNA.



CENTERLESS
THREAD GRINDER

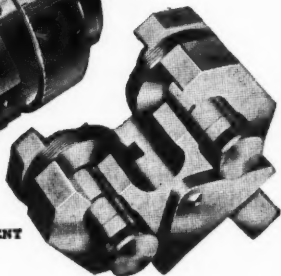


PIPE THREADING & CUTTING-OFF MACHINE



LANDMATIC
HEAD

LANROLL
ATTACHMENT



COMPLETELY NEW!

Completely Automatic GRINDING!



On a brand new line of Heald Centerless Internals

There's no comparing these new Heald Centerless Internals with any others. From base to bridge, they're completely new—completely different in design and performance. And they handle a wide range of cylindrical work—wider than ever before.

Peg your production rates high. For these are high-capacity, high-production, high-precision machines... each with continuous and completely automatic cycle (loading through unloading)... each grinding "the centerless way" for uniform wall thickness, perfect concentricity, and errorless reloading. They offer you:

GREATER ACCURACY AND PRODUCTION. Base and wheelslide more rigid... feeds and table action uniformly constant throughout the day, remaining so without adjustment... wheelhead and work rotation smoother.

QUICKER SETUP. Individual, graduated knobs set feed rates and table speeds... quickly adjusted reverse dogs set table stroke.

MINIMUM MAINTENANCE. Valves mounted in front for easy accessibility... steel hydraulic tubing means leak-proof joints... electrical controls grouped at rear... isolated power unit rolls out from base.

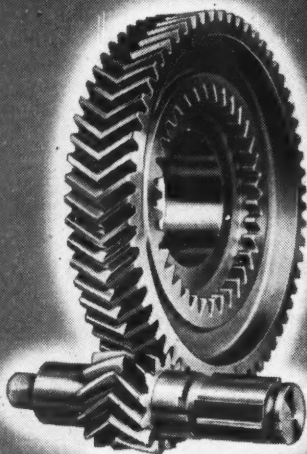
Consult Heald branch office nearest you, or write for free bulletin on the 281-381 Centerless Internal Grinding Machines.

THE HEALD MACHINE COMPANY, Worcester 6, Mass.

Branch Offices in: Chicago • Cleveland • Dayton • Detroit • Indianapolis • Lansing • New York



2 WAYS TO TELL A BETTER HERRINGBONE GEAR



1. IS IT PRECISION MADE?—The Farrel-Sykes method of generation gives Farrel gears extreme accuracy of tooth spacing, contour and helix angle. This tooth-to-tooth accuracy pays off in smooth, uniform power flow. Backlash is reduced to a minimum and the load is distributed evenly across the entire face width.

2. DOES IT HAVE A BACKBONE?—The *backbone*, formed where the two helices meet without a center groove, puts the entire face width to work and provides extra strength and higher load-carrying capacity in less space—a definite advantage in many applications. Farrel-Sykes gears are known as the *Gear with a Backbone*.

The precision generated *Gear with a Backbone*, made by Farrel, is available in any size up to 20 feet in diameter, for practically any application. Information and engineering assistance available, without obligation.

FARREL-BIRMINGHAM COMPANY, INC.

344 VULCAN ST., BUFFALO 7, N. Y.

Plants: Ansonia and Derby, Conn., Buffalo, N.Y.

Sales Offices: Ansonia, Buffalo, New York, Boston, Pittsburgh, Akron, Chicago, Los Angeles, Tulsa, Houston

Farrel-Birmingham

FB-405

HOWARD CAMPBELL
Editor

GENE J. SCHWARBER
Advertising Manager

J. C. DUFF
Circulation Manager

RICHARD S. KLINE
GEORGE E. HAY
431 Main St., Cincinnati 2
MAin 0182

G. M. FILLMORE
342 Madison Ave.
New York 17
Murray Hill 6-3899

JOHN M. KRINGS
Tribune Tower, Chicago 11
Delaware 5441

CHARLES H. DEILY, JR.
351 Mattison Avenue
Ambler, Pennsylvania
Ambler 0339

NORMAN S. ROGERS
Art Director

MEMBER



Published monthly and
copyrighted (1947) by
GARDNER PUBLICATIONS, INC.
31 Main St., Cincinnati 2, Ohio

Howard Campbell President
John M. Krings Vice President
Ronville M. Fillmore Vice President
Margaret L. Gardner Secretary
Richard S. Kline Treasurer

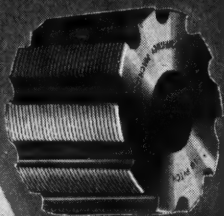
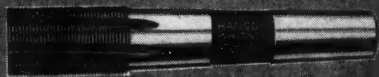
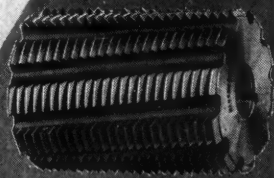
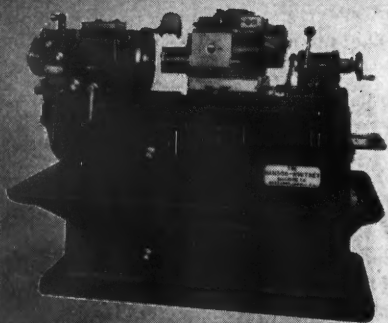
Printed in U. S. A.

MODERN Machine Shop Contents

| | |
|---|-----|
| C. P. Shops Are Completely Equipped..... | 124 |
| By HOWARD CAMPBELL | |
| Spinning and Panel-Beating of Aluminum Alloys, II..... | 138 |
| By E. R. YARHAM | |
| A Planned Handling System Saves Time and Space at Morse Chain | 164 |
| By R. O. ERICKSON | |
| Good Foremanship Is Important..... | 180 |
| By ERNEST W. FAIR | |
| Modern Equipment at Work | |
| —Progressive Dual Seam Welder Aids Trailer Body Production | 184 |
| —Carboloy Swaging Blocks Reduce Wear in Dies at Underwood | 190 |
| —Borizing 13 Surfaces Simultaneously..... | 192 |
| —Reducing Costs with Built-Up Bending Die..... | 194 |
| Ideas from Readers | |
| —A Useful Drilling Jig for Uneven Workpieces, by Robert Mawson | 200 |
| —Blocked-Up Press Column Provides More Space for Drilling Operations, by Walter Rudolph..... | 204 |
| —Device for Centering Milling Machine Cutters, by D. E. McDonald | 208 |
| —Tool Post Wire Guide, by Bert Charlesworth..... | 214 |
| News of the Industry..... | 218 |
| Newly Elected Officers and Directors of N.M.T.B.A..... | 224 |
| New Shop Equipment | 228 |
| Services Directory | 358 |
| "Where to Get It" | 360 |
| Cartoon | 364 |
| Over the Editor's Desk..... | 366 |
| Index to Advertisements | 369 |

A COMBINATION THAT'S HARD TO BEAT

Harrison-Whitney semi-automatic thread milling
machines and ground multiple thread
milling cutters



This combination assures you speed . . . accuracy
. . . no spoilage . . . economy and lower costs.
Except for loading and unloading the H-W Thread
Miller is entirely automatic and produces external
or internal, right or left hand, straight or tapered
threads in one revolution of the work. The cutters
are finished all over after hardening, the spacing,
form and relief being held to very close limits. They
can be relied upon for accuracy and durability.
Inquiries pertaining to thread milling problems
respectfully solicited.

Harrison-Whitney
MACHINE TOOL COMPANY
NEW YORK, N. Y.

Did you see
the dramatically
NEW
H-W THREAD GRINDER
at the Machine Tool Show?
If not,
write at once for details.

GISHOLT'S

**Hardened steel
bed ways are one
of the greatest
contributions
ever made to
precision machining
on a turret lathe**

GISHOLT MACHINE COMPANY, NEWARK, N. J.

THE GISHOLT ROUND TABLE
represents the collective experience
of specialists in the machining,
surface-finishing, and balancing
of round and partly round parts.
Your problems are welcomed here.



GISHOLT TURRET LATHES
give you precision that hard steel
bedways, grinding, planing, and
turning surfaces are able
to. Economical, accurate,
reliably maintained,
efficiently
operated.
GISHOLT
MACHINES

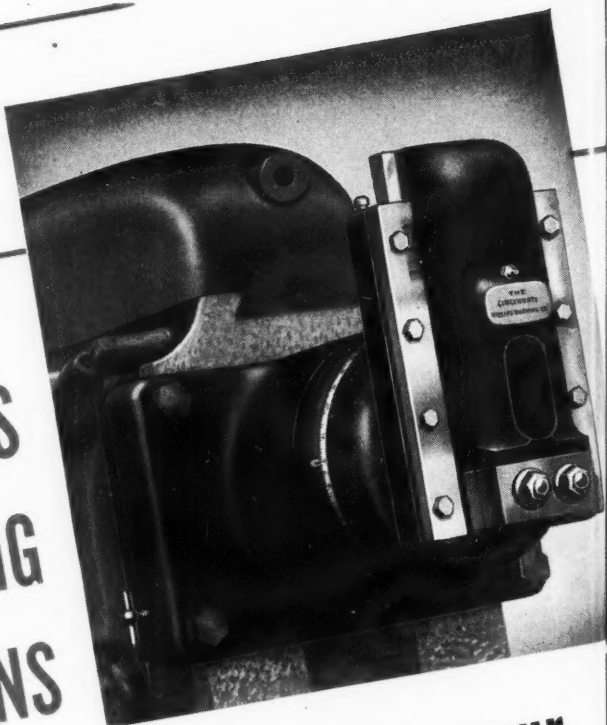


turret lathes • automatic lathes • superfinishers • balancers • grinding machines

Cincinnati Slotting
Attachment mounted
on a CINCINNATI High
Power Miller.

IT ADDS SLOTTING OPERATIONS

...to the work assignable to your



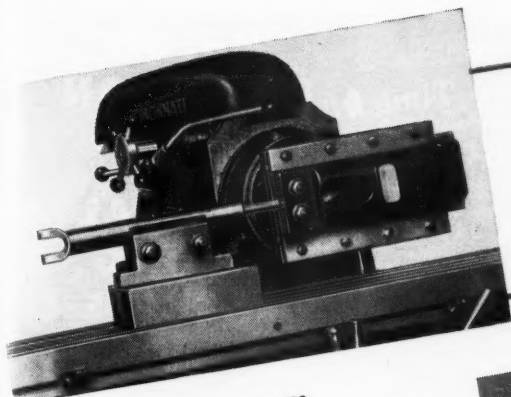
Attachment being mounted on machine.

HINTS ON USING

When slotting "blind" keyways, the inner end must be grooved or drilled to avoid breaking the tools.

Feed work into tool in increments of .001" to .002" per stroke for light tools; .003" to .005" for heavier tools.

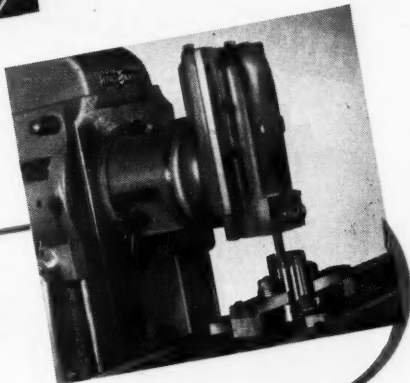
Do not use power feed; feed by hand only when tool is out of work.



These two views show the attachment at work on Dial Type Millers.

BRIEF SPECS.

Stroke per minute.....
 same as machine spindle speed
 Length of stroke.....0 to 4 in.
 Size of tool shank..... $\frac{1}{2}$ to 1 in.



Cincinnati Miller!

● By changing rotary motion of the machine spindle into reciprocating motion of a tool holder slide, the Cincinnati Slotting Attachment performs some very useful work. With it, you can assign internal and external keywaying and slotting operations to your Cincinnati Miller. It will handle production quantities, tool and die work, and light shaper operations. And the reciprocating slide can be set at any angle throughout 360° . You may obtain a Cincinnati Slotting Attachment for any Cincinnati knee and column type miller from the current models to those built way back in the 1900's. Further information is contained in catalog M-919-1.

THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO, U. S. A.

MILLING MACHINES

• BROACHING MACHINES

• CUTTER SHARPENING MACHINES

January, 1948

MODERN MACHINE SHOP 9

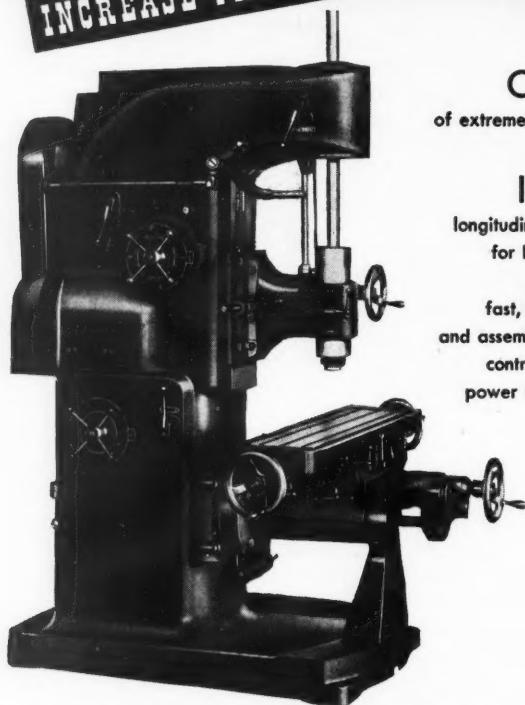
Eliminate Extra Setup Time

REDUCE UNIT COSTS

Save Unnecessary Work Transfers

INCREASE PRODUCTIVE TIME

No. 50 PRECISION BORING AND VERTICAL MILLING MACHINE



Combined in a single solid-base machine of extreme capacity — every feature for precision boring and accurate milling!

In the No. 50 are exceptional cross and longitudinal table travel plus long spindle travel for handling an extensive range of work — rugged, rigid bed-type construction for fast, heavy cutting — precision manufactured and assembled for positive accuracy — convenient controls for easy, effortless operation — and power to spare for the heaviest, toughest jobs.

With far greater range than other machines of comparable size, the No. 50 is an assured investment in reduced costs and more profitable production.

*Send For Complete
Catalog Details*

Sixteen Spindle speeds, 40 to 2000 r.p.m. • 9 Spindle feeds, .005" to .010" • 100" table traverse per minute in both directions • 16 Table feeds, 5/16" to 20" per minute • 7½ h.p. Drive

W. B. KNIGHT

MACHINERY COMPANY



MORE GOODS for MORE PEOPLE at LOWER COST

3920 WEST PINE BLVD. • ST. LOUIS 8, MISSOURI



EVERY SHOP can make money with a Gear Shaper

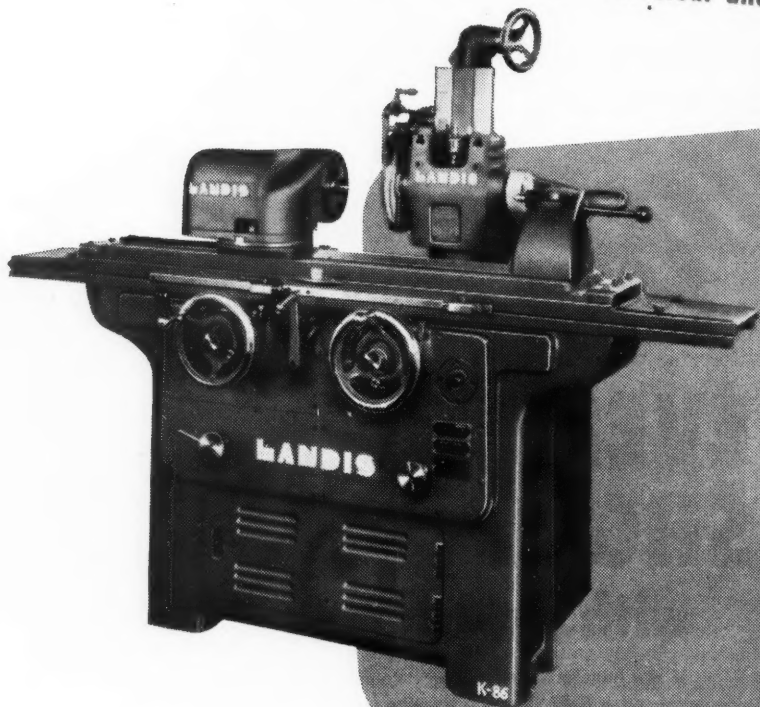
If you have precision gears or non-gear parts to be produced in sufficient volume, a Gear Shaper is a sound investment. The Fellows cutter, as applied to a wide variety of work, provides exact duplicating accuracy at the lowest possible cost per piece. Again, the wide versatility of your Gear Shaper makes it the "busiest machine" in the shop... a money maker for you. Bulletins are available on a complete line of Gear Shapers for capacities up to 100 inches.

Fellows

The Fellows Gear Shaper Co., Head Office and Export Dept., Springfield, Vermont. Branch Offices: 616 Fisher Building, Detroit 2, 640 West Town Office Building, Chicago 12, 7706 Empire State Building, New York 1.

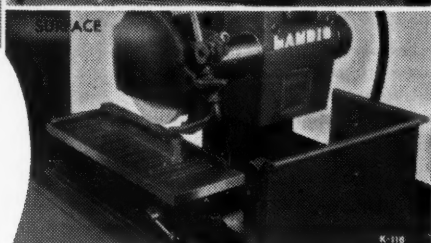
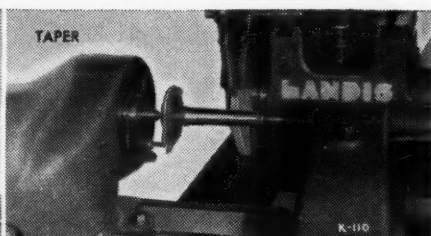
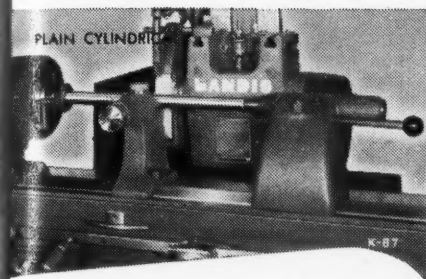
24 Different Precision Grinding Operations

can be done on 12" x 28" universal and tool



LANDIS TOOL
Precision Grinders

for detailed information, request catalog K-45



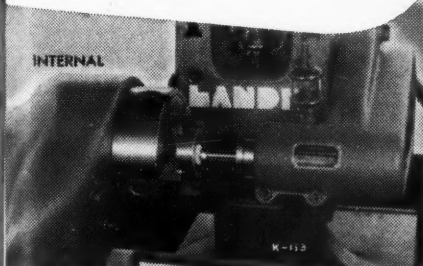
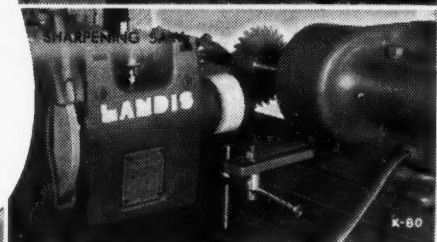
With Standard Equipment

1. Cylindrical
2. Taper
3. Face
4. Surface (operations without attachments only)
5. Clearance on Saws, Cutters and Reamers
6. Flutes on Taps
7. Face of Teeth on Formed Cutters
8. Spiral Mill Grinding

With Optional Accessory Equipment

9. Milling Cutters
10. Wet Grinding
11. Dry Grinding
12. Internal Grinding
13. Hobs (right or left hand)
14. Parallel Blocks, Flat Forming Tools and Dies
15. Surface Grinding (quantity lots)
16. Screw Machine and Other Forming Tools
17. Angular Wheel Face
18. Reamers, Taps and Form Cutters
19. Gear Cutter (staggered or straight teeth)
20. Cylindrical Work Requiring Work Rest
21. Face Mills (up to 18 1/2" diameter)
22. End Mills (with taper holding attachment only)
23. Drills (from 3/32" to 1 1/2" diameter)
24. Saws (from 7 1/2" to 26" diameter)

675



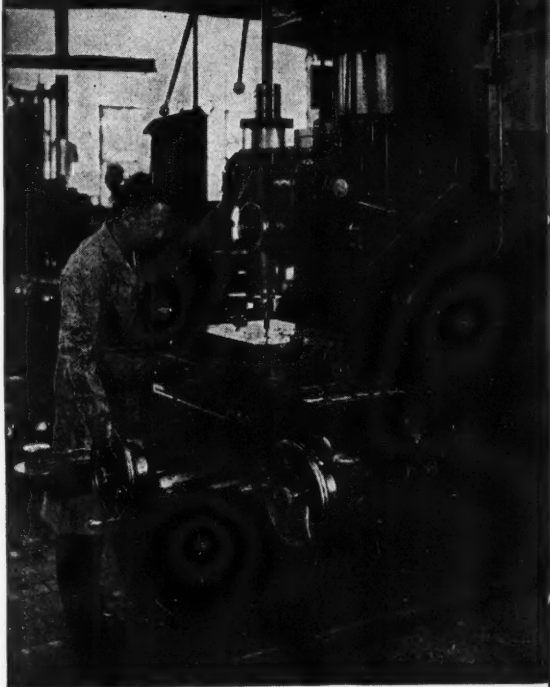
LANDIS TOOL COMPANY, WAYNESBORO, PA.

● On particularly close tolerance work, such as making the die illustrated, Fosdick Jig Borer are demonstrating their ability to meet the exceptional accuracy demanded in hundreds of tool rooms and tool and die shops.

The machine is exceptionally rigid—for example the bed of rugged construction is heavily ribbed to avoid distortion. A three point bearing serves for leveling and maintains perfect alignment. A sturdy sliding head supports spindle close to the work.

Operation is also very simple. All controls are centralized for ease of control. Twelve speeds in geometrical progression from 60 to 1500 RPM are instantly obtained through a single lever. Nine feeds from .00125 inch to .010 inch are available through a single control lever with direct reading index.

Thus the Fosdick Jig Borer offers all the advantages of high priced precision machines at a comparatively low cost. If you have a precision drilling—boring—facing or even light milling operation—put it on a Fosdick for speed—accuracy and low cost.



A full descriptive bulletin is available—ask for Fosdick Jig Borer Bulletin M.S.J.

FOSDICK

MACHINE TOOL CO.
CINCINNATI 23, OHIO

TOPS in TAPPING

PERFORMANCE

Jarvis-Dowding

TAPS AND DIES



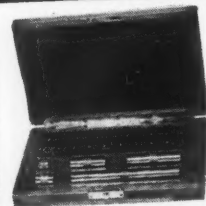
*Here's the solution
to your tapping problems*

For maximum performance under tapping conditions prevailing in your shop, make your next tap order read "Jarvis-Dowding" . . . custom finished taps, designed to meet your demands. "Jarvis-Dowding" Taps cut more threads with less power, require minimum sharpening, and provide greater dependability on the job. A special hardening process under laboratory control adds a toughness that means longer life. Try "Jarvis-Dowding" Taps and see, feel, and figure the difference."

WRITE FOR BULLETIN JD-101

Jarvis POWER TOOLS

THE CHARLES L. JARVIS CO., MIDDLETOWN IN CONNECTICUT
Rotary Files • Flexible Shaft Machines • Taps and Dies
Tapping Attachments • Quick Change Collets and Chucks



Shop Set MTT.
Mahogany case, \$100.00.



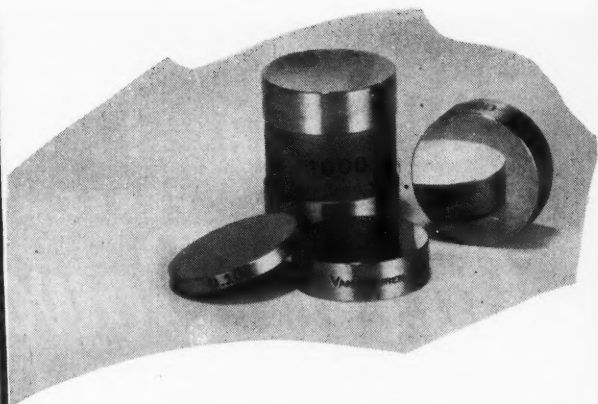
Economy Set MT.
Mahogany case, \$40.00.



Micrometer Set M21.
Mahogany case, \$60.00.



Toolmakers' Set M64.
Mahogany case, \$17.50.



THE NEW VAN KEUREN

$\frac{7}{8}$ " DIAMETER MICROGAGES ARE THE BEST BUY

60% more wearing surface . . . 25% greater accuracy . . . Body true cylinders . . . Ends square with body . . . No increase in price.

A Foundation For Accuracy For 25 Years

Van Keuren Microgages have been popular for over 25 years, because they provide a low cost means of securing accuracy in the shop, to meet the demands of the inspection department.

The original Microgages were made $\frac{11}{16}$ " in diameter. The $\frac{7}{8}$ " body diameter of the NEW Microgages are ground true cylinders, and the end surfaces are held square with the body within close limits. This enables them to be easily aligned on machine ways for measuring carriage travel. The new Microgages have 40% more wearing surface than rectangular gages and they wring together tenaciously. The $\frac{7}{8}$ " diameter body provides excellent rigidity for the 6" long blocks.

Microgages up to 1" length are held within a tolerance of plus 12 millionths minus 8 millionths. They have an average wear allowance of 4 millionths oversize. They are available as individual gages from .0625" to 6" length, or in sets especially designed for general shop use, for tool setting and for tool makers and machinists.

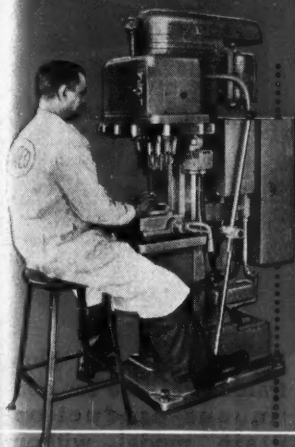
THE *Van Keuren* CO.,

29th YEAR

175 WALTHAM STREET, WATERTOWN, MASS.

Light Wave Equipment • Light Wave Micrometers • Gage Blocks •
Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires •
Thread Measuring Wires • Gear Measuring System • Shop Triangles •
Carboloy Plug Gages • Carboloy Measuring Wires

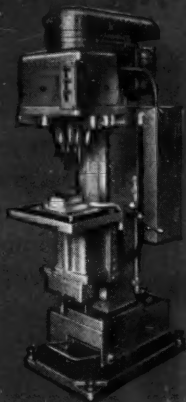
Investigate **NATCO** first... for the "HOLE" story in Light Sensitive High Production Drilling or Tapping



A complete line of close control, high speed machines for sensitive drilling or tapping multiple holes in small work in cast iron, steel, aluminum, plastic or wood.

◆ **A-33A** Combination Head and Foot and Air Oil Feed Machine for both light precision drilling and tapping.

◆ **A-33B** Air Feed Machine used primarily for light precision tapping. A-33A & A-33B machines available with or without air operated rotating table.

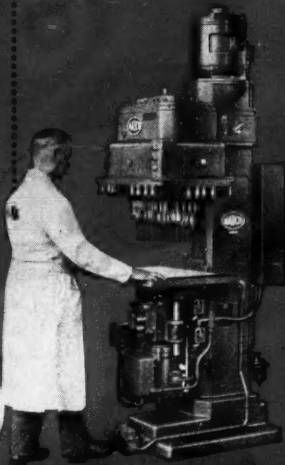


◆ **G-5** Arranged with 12 spindles for drilling and tapping small or medium sized work. Hand & foot or hydraulic feed tables.

◆ **G-6** Similar to G-5 except has larger head area, 24 spindles and 5HP head drive motor and larger work table.

Write today for details on the A-33 Bulletin 247 and G-5 and G-6 Bulletin 522

NATCO DRILLING, BORING, TAPPING and FACING MACHINES



NATIONAL AUTOMATIC TOOL COMPANY, INC., Richmond, Ind., U. S. A.
Branch Offices: 1809 Engineering Bldg., Chicago • 409 New Center Bldg.
Detroit • 1807 Elmwood Ave., Buffalo • 2902 Commerce Bldg., New York City

Call a Natco Field Engineer

EN
AGES
BUY
reater
quare

ears
ver 25
ecuring
ection

meter.
ground
e with
to be
arriage
ng sur-
r tena-
rigidity

ance of
n aver-
ey are
ngth, or
or tool

MASS.
cks •
Wires
Triam

y, 1948

The
KALAMAZOO
Metal Cutting **BAND SAW**

FAST
VERSATILE
ACCURATE
SAFE

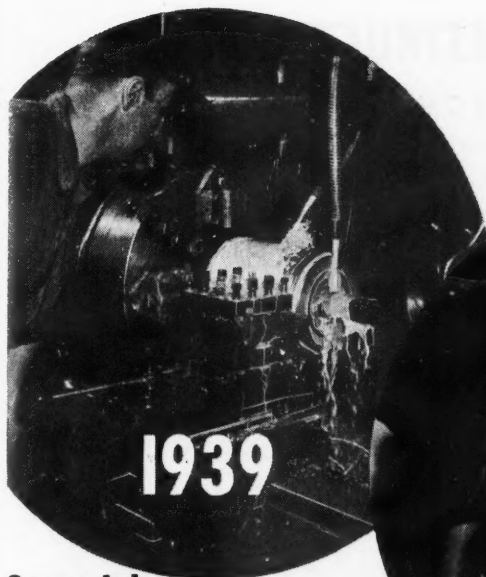
Cut costs by speeding production—saving labor and reducing investment. A low-cost machine adaptable to 95 per cent of all cut-off work. Continuous cutting action—cuts to close limits—and handles solids, tubes or odd shapes.



Production model illustrated, suitable for continuous production. Plain model without coolant for intermittent cutting.

A Product of
MACHINE TOOL DIVISION

KALAMAZOO TANK & SILO COMPANY
Kalamazoo 16 • Michigan



1939



1948

Same Job . . .

Same Operator . . .

Same Machine . . .

Same Productive Volume

but

UNIT COST UP 35%

● Thousands of shops face this picture. After reconversion, they are again producing parts in the same volume as in the best prewar year. Operators' skill and machine productivity may be fully up to 1939 records.

But surveys of over 2500 metal working plants disclose that cost of materials, overhead, and labor are 35% above 1939.

To make up for these higher costs and yet maintain a satisfactory margin

of profit without resorting to a steep rise in selling price, confronts management with a serious problem.

If your production processes include turning of metal parts, a Warner & Swasey field engineer may be able to help you. After studying your jobs, he probably can recommend improved machines, new tools and methods, or suggest accessories to be added to your old turret lathes to make them more productive.

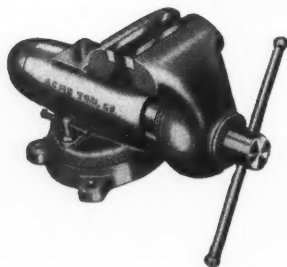
*You can Machine it Better, Faster, for Less...
with a Warner & Swasey*

TURRET LATHES, SINGLE & MULTIPLE SPINDLE AUTOMATICS, PRECISION TAPPING & THREADING MACHINES



PRACTICALLY INDESTRUCTIBLE!

ACME BENCH VISES—Ruggedly Built
Precision Made offers you



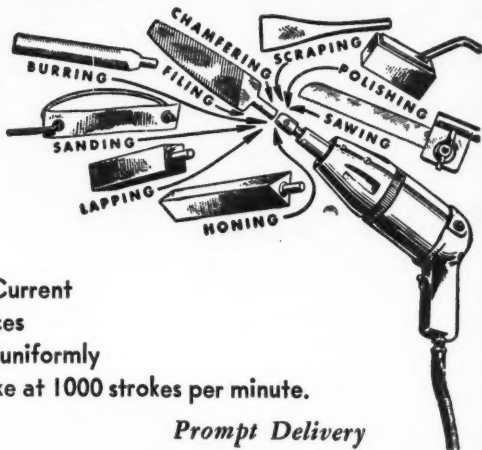
Longer Vise Life
Maximum Gripping Power
No Side Twist or Wobbling
Unbreakable Sleeve Nut
Interchangeable Ground Jaws
11 Sizes from 2" to 6"

Vise Head and Nut Castings are Malleable Iron; other parts are high tensile Semi-Steel Castings. Makes them practically indestructible.

.

ELIMINATE HAND FILING OPERATIONS!

PORTABLE • ELECTRIC,
RECIPROCATING TOOLS
will eliminate many of
your hand filing or fin-
ishing operations.



Light in Weight
Operates on 110 Volts AC or DC Current
Gets into those hard-to-reach places
Does work quickly, accurately and uniformly
Delivers $\frac{1}{8}$ " or $\frac{3}{8}$ " long fixed stroke at 1000 strokes per minute.

Write for Literature

Prompt Delivery



ACME TOOL COMPANY

69 WEST BROADWAY

NEW YORK 7, N. Y.

uilt
you

Semi-



7, N. Y.

, 1948

**FAST...
ECONOMICAL**



"American" **GRINDING WHEELS**

Portable tools turn out more work with "American" high speed snagging wheels. There's a fast cutting "American" abrasive to "hog it off" without burning... or to give high finishes if required. Ideal for fast work on welding, blacksmithing, piping and structural jobs where time is money. "American" wheels are available in all standard shapes and sizes—let us know your requirements.

AMERICAN EMERY WHEEL WORKS
2 RICHMOND SQUARE, PROVIDENCE 1, R. I.

Avey's
PLUS
features

add up to **TOP PRODUCTION**

Vee belt used on final drive from gear box to spindle. Increases speed and sensitivity in drilling. Carries full horsepower from motor to job.

**"VEE"
BELT
DRIVE**



AVEY TYPE BMA-6

Four Spindle—12" Overhang

- 1st spindle—Avey-matic feed
- 2nd spindle—Plain power feed
- 3rd spindle—Hand Feed
- 4th spindle—Tapping (reversing motor)

plus

STANDARD MOTOR — EACH SPINDLE

Each spindle of AVEY BMA-6 individually motor-driven by standard frame constant speed motor. Foot-mounted motor easily interchanged or replaced. Standard motors can be stocked.

plus

SIX SPEED CHANGES

On the AVEY BMA-6 six speed changes are made through selective, sliding gears. This automotive type of gear shift is controlled by a single lever at front of machine. Provides versatility and effective operation.

plus

SPEEDS OBTAINED + SLIDING GEARS

Selective, sliding gears of AVEY BMA-6 change speeds quickly and easily. Each gear is manufactured and finished by accurate, modern process, shaved, hardened and lapped. Insures smooth operation and long performance.



CAPACITY Cast-Iron

No. 2BMA6— $\frac{7}{8}$ " No. 3BMA6— $1\frac{1}{4}$ "

Single to six spindle machines, equipped with hand feed, power feed or reversing motor tapping.

CLIP AND MAIL TODAY



Avey DRILLING
MACHINES
CINCINNATI, OHIO

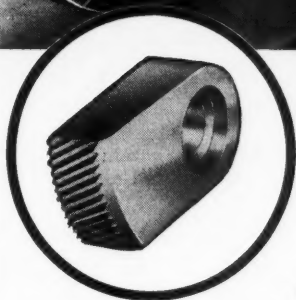
**AVEY DRILLING MACHINE CO.,
CINCINNATI 1, OHIO**

Gentlemen: Please send without obligation your new Bulletin 647.

COMPANY _____
ADDRESS _____
NAME _____

SENECA FALLS *Automatic* WORK DRIVER

*Drives Anything
Between Centers*

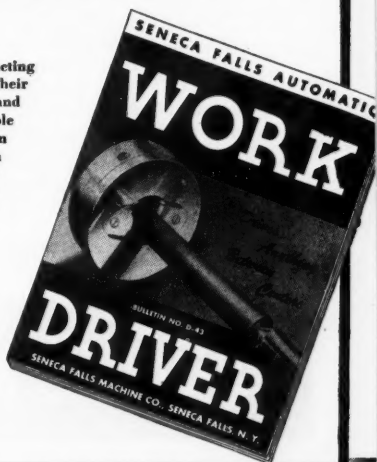


**Jaws now available with
angular serrations...**

● These self-centering, quick-acting Drivers have long demonstrated their ability to eliminate dogging time and to enable one operator to attend multiple machines. Now their application has been

widened with development of a new jaw having serrations milled at a suitable angle. These angular serrations provide an overlapping contact for surer and quicker grip on smooth finished, as well as hot rolled stock and forgings having a relatively hard surface. This positive grip eliminates slippage and resultant tool breakage...especially important when costly carbide tools are used.

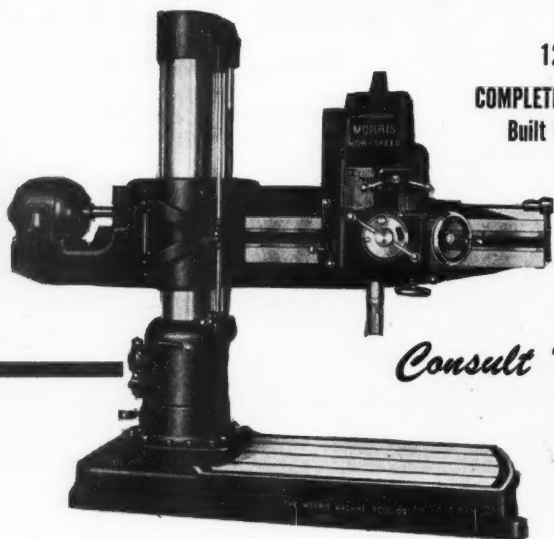
Seneca Falls Work Drivers are designed for use on any engine or multiple-tool lathe and for certain work on turret lathes and grinding machines. In addition to time-saving, the Seneca Falls Automatic Work Driver provides greater safety for the operator since there are no projecting screws or sharp corners to catch clothing or injure hands. Made in 18 standardized models for work diameters ranging from $\frac{1}{4}$ to $6\frac{1}{2}$ inches. Write for Bulletin D-43.



SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

MORRIS

MOR-SPEED RADIALS



11" Column
12 Spindle Speeds

COMPLETE CENTRALIZED CONTROL

Built in 3' - 4' - 5' and 6'
Arm Lengths

Consult Morris

For high production work

For engineering "Know How"

For facilities to design, develop
and manufacture highly efficient
machines for mass production.

● The Mor-Speed radial pays its own way . . . with greater production and cost reduction. It offers a variety of speeds and feeds so that a more perfect speed for each job can be selected.

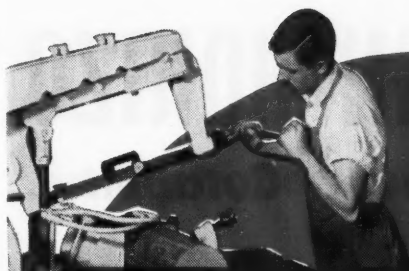
Centralized controls and more automatic stops and trips save time. Additional safety devices protect the workman, the machine and the work. Automatic and constant lubrication prevents damage and saves time. Better alloy steels, better hardened surfaces, and added anti-friction bearings at every vulnerable point throughout the entire machine enable it to take punishment undreamed of a few years ago.

These features coupled with greater strength, rigidity and balance make the MORRIS Mor-Speed Radial the most profitable radial drill investment today.

WRITE FOR COMPLETE DETAILS.



The **MORRIS** Machine Tool Co.
CINCINNATI 3, OHIO



NEW SIMOMETER

Dials you in on
LOWER HACKSAW COSTS

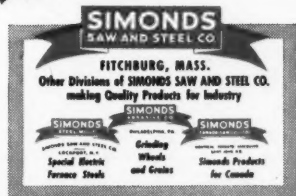


with SIMONDS "Red End" BLADES

SECRET of straighter, smoother cuts and longer blade-life is **ACCURATELY TESTED TENSION.**

NEW SIMONDS SIMOMETER enables you to tension any size blade correctly in a matter of seconds . . . and so get top cutting performance out of the top brand of blades — SIMONDS "Red End".

SEE HOW SIMOMETER SAVES SAW-DOLLARS! A Simonds Saw Specialist will demonstrate — on your own hacksaw machines — this easy-to-read tension tester. **NO OTHER METHOD LIKE IT.** Just call your distributor or the nearest Simonds office.

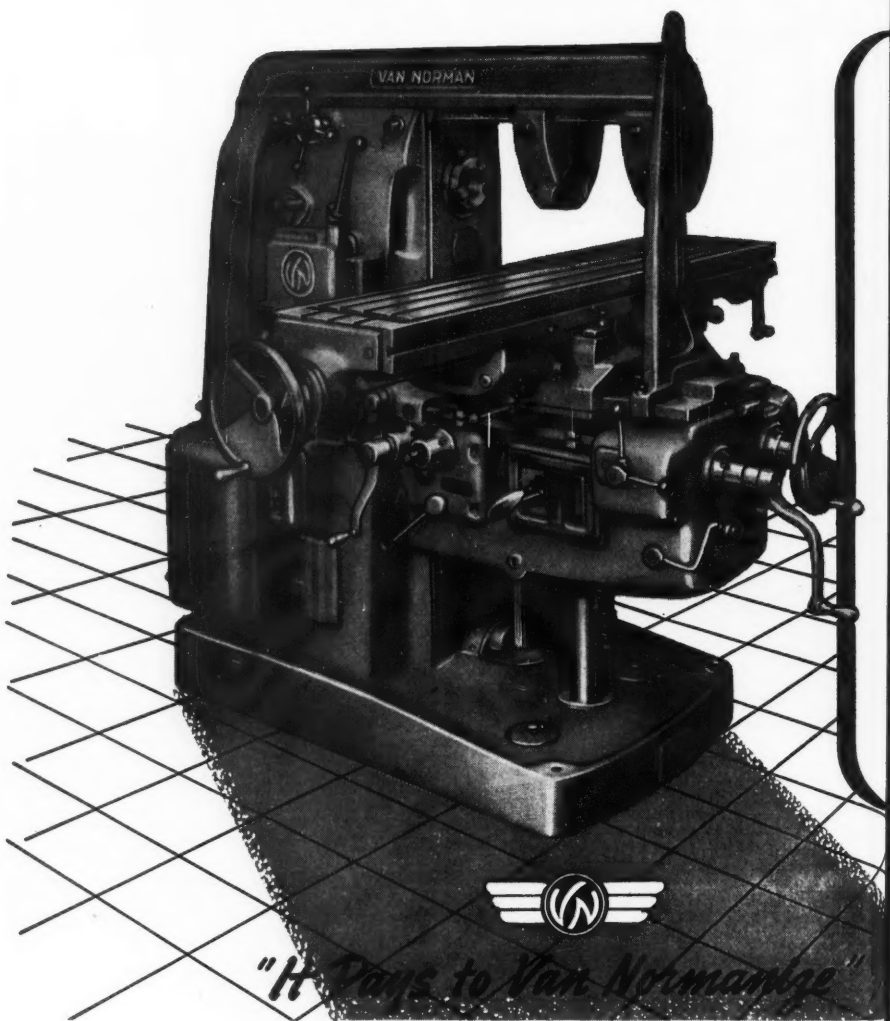


BRANCH OFFICES: 1350 Columbia Road, Boston 27, Mass.; 127 S. Green St., Chicago 7, Ill.; 416 W. Eighth St., Los Angeles 14, Calif.; 228 First St., San Francisco 3, Calif.; 311 S. W. First Avenue, Portland 4, Ore.; 31 W. Trent Ave., Spokane 8, Wash. **Canadian Factory:** 595 St. Remi St., Montreal 30, Que.

low"
velop
effi-
pro-

VAN NORMAN HORIZONTAL

Provide Improved Cutability...



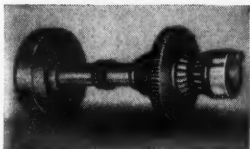
NTAL MILLING MACHINES

Exceptional Ease of Control



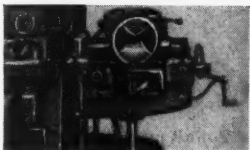
Built-in Spindle Flywheel

The Van Norman spindle design incorporates a heavy flywheel mounted inside the column. It assures uniform, uninterrupted transmission of power to the cutter because it effectually cushions by its inertia, any fluctuation of speed and power. The flywheel increases and improves cutability... results in a smooth finish of work surface.



5-Bearing Spindle

The large diameter hardened alloy steel cutter spindle rotates on 5 anti-friction bearings. Large double-opposed taper roller bearings in front provide minimum overhang... center double-opposed taper roller bearings add rigidity. A straight roller bearing supports the rear. This construction assures maximum spindle support and rigidity under every type of cut.



Front & Rear Power Control

All power feed controls, as well as 6-way rapid traverse, can be operated from front or rear of the machine. This dual feed control simplifies operation, saves time, reduces worker fatigue. The finger tip controls are directional and can be operated either with spindle stopped or rotating.



Ease of Spindle Control

The single lever speed selector, convenient spindle reverse and spindle clutch levers are located on the side of the column for ease of control. The spindle clutch lever for starting and stopping the spindle is quickly adjusted to the desired and most convenient front or rear operating position.

From every angle, Van Norman Horizontal millers give you every advantage in cutability and ease of operation. These machines will give maximum quality service and increase production on a wide

variety of general purpose and production milling. They are available in a wide variety of models and can be had with plain or universal saddles. Write for complete information.

VAN NORMAN COMPANY
SPRINGFIELD 7, MASSACHUSETTS



The Hardest Possible Metal Sawing

... cutting off test specimens in the Metallurgical Laboratory of this giant steel plant. There is no time for pampering here. Each saw must handle anything that comes, as it comes—the hardest steels and toughest alloys, in all degrees of hardness—in any size, any form or condition—because each heat, each drawing, and each forming run has to be tested.

The steel mill where these pictures were taken reports that these saws have been operating 24 hours, 7 days a week for the last five years. Maintenance cost has been practically non-existent. Furthermore, the efficiency of these saws has made possible the elimination

of an equal number of other sawing machines in the department.

The answer to your cut-off problem, whether large or small, will be found in our new C48 catalog. The services of our field engineers are also available in every locality. Send for either or both now.

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"
5700 Bloomingdale Ave. Chicago 39, U.S.A.



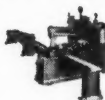
No. 1, No. 2 Series



No. 48 Series



No. 6 Series



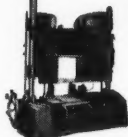
No. 9A Series



No. 8 Series



No. 19 Series



No. 24 Series



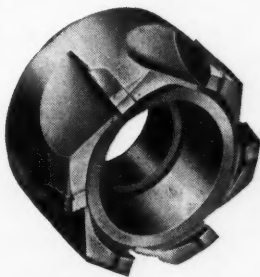
if it's a l-o-n-g hard pull

USE BARBER-COLMAN CARBIDE-TIPPED MILLING CUTTERS

This solid, continuous cut in cast-iron, straight across a flat surface, is an ideal operation for B-C Carbide-Tipped Shell End Mills. Cutting Teeth, constantly engaged in the cut, need diamond-hard, sharp cutting edges to keep pace with production requirements. Constant contact with the material and the abrasive action formerly made frequent sharpening necessary with High Speed Cutters.

With B-C Carbide Shell End Mills, now used on the job, tool life is increased from 30 to 200 pieces per cutter sharpening, and production is increased 2 to 3 times over what was formerly obtained with HSS cutters.

Perhaps there are ideal conditions for carbide milling operations in your production lines. Carbide cutters cannot be expected to show



improved results on all milling jobs, but under certain conditions they show definitely superior production advantages. Why not send us specifications on one of your jobs, and let us recommend and quote the proper carbide cutters for your consideration. Call your nearest Barber-Colman representative today.

Barber-Colman Company

GENERAL OFFICES AND PLANT 123 LOOMIS ST., ROCKFORD, ILLINOIS, U.S.A.



JOB FACTS

Operation — Face mill four sides of machine table, each surface 3' wide x 27' long.

Material — Cast-iron.

Cutters — B-C Carbide Tipped Shell End Mills.

| | HSS Cutter | C-T Cutter |
|----------------|-----------------------|------------------------------------|
| Feed..... | 3" per min. | 8 1/4" per min. |
| Speed..... | 45 S.F.M. | 210 S.F.M. |
| Cutting Time | 80 sides in 10 hours. | 140 sides in 200 pieces per sharp. |
| Tool Life..... | 30 pieces per sharp. | 200 pieces per sharp. |



SHELDON

TRB S-56 PRECISION LATHES



Production Capacity — comes ready for production

The new TRB-S56 Sheldon Precision Lathes have the speed, stamina and capacity for general production use—11¼" swing, 1⅜" hole thru spindle, 1" collet capacity. They will operate safely at high speed and work to the very closest tolerances, for spindle bearings are "Zero Precision" tapered roller bearings, the most accurate obtainable.

*Write for Catalog of
Sheldon and
Sheldon-Vernon*

They will take a "healthy cut" too, *because they have double V-belts to the spindle* to assure full power from their 1 h.p. motor at the point of work. They come ready for production — no breaking-in period is required—start earning from the day received.

SHELDON MACHINE CO. Inc.
Manufacturers of Sheldon Precision Lathes • Milling Machines • Shapers
4250 N. KNOX AVENUE • CHICAGO 41, ILLINOIS, U. S. A.

Want real speed? use

JOHNSON *metal cut-off* BAND SAW

YOU GET MORE SPEED with the Johnson because of its greater stability, the exceptional rigidity of its three-point-supported, heavy bed, and equally vital, the vibrationless stiffness with which the saw is held to the work by its wide supporting guide rolls. All this simply means that the saw blade can be pushed harder, will last longer, and will cut more accurately and closer to tolerance, which in turn means a further saving in material and machining time.

Every important dimension in the machine is **GENEROUS**. Bandwheels, 16" diameter, give plenty of grip on the blade and cause mighty little twisting or bending

stress. Wheel axles are extra-heavy, with large auto-type roller bearings. Pivot bar is of extra large diameter. And the capacity of the machine, 10" high, 18" wide, covers just about every cutting-off need for any shop.

Made in two types—dry cutting for general work, wet cutting for high production. Casters for quick portability if desired.

Big capacity—10"x18"
—all you need—

Automatic, hydraulic feed, quick adjustable from front of machine.

Quick-setting vise, operated from front of machine.

Stop for setting work, duplicating length cut-off.

Four motor speeds. Automatic shut-off at end of cut.



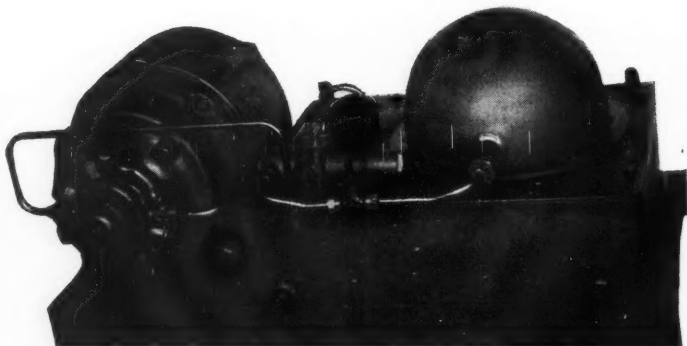
JOHNSON

MANUFACTURING CORP.
620 CHRYSLER BLDG.,
NEW YORK 17, N. Y.



HIGH PRESSURE HYDRAULIC POWER UNITS

one gpm @ 3000 psi
motor mounted pump, unloading and
relief valve and accumulator on 5-gallon
reservoir with 5-microne filter.



Are You Joining the Parade to Higher Pressures?
Faster—Safer—at Lower Cost.

DELIVERY NOW!!!

Other Products — Cylinders for Air—
Water—Oil—Operations

Power Plus Products Company

DETROIT 7

Sunnen Precision Honing Will CUT YOUR PRODUCTION COSTS On Jobs Requiring Accurate Internal Diameters

Sunnen Precision Honing may cut your production costs in one or more ways. The experience of many manufacturers has shown that production of accurate straight round holes can be increased from 150% to 600%.

Because you can hold a tolerance of .0001" and less, costly rejects are held to a minimum.

Often other operations such as internal grinding or lapping can be eliminated, thus saving time and reducing costs.

With the Sunnen Precision Honing Machine you can produce a full bearing surface in any hole—in steel, cast iron, bronze, aluminum, carbide, ceramic, plastic or glass. A complete line of abrasives is available to produce any degree of surface finish desired.

The Sunnen Precision Honing Machine produces straight, round holes, corrects errors from previous operations, and duplicates sizes easily. Smooth, accurate surfaces assure interchangeability—and longer life for Sunnen-honed parts.

Sunnen Honing can provide real savings in long-run production costs, and even greater savings on short runs when frequent size changes are necessary.

Call in a Sunnen engineer or write for complete information.

Range 120" to 2 625"
diameter



SUNNEN PRODUCTS COMPANY
7933 Manchester Ave. St. Louis 17, Missouri
Canadian Factory, Chatham, Ontario

Typical Examples



Universal bearing honed to 10 micro inch finish gives longer service.



Line reamer bushings, diameter 2.375", accuracy held to .0001".



Miniature aircraft cylinder—smooth, accurate honing provides better compression and longer life.



Aviation Hydraulic Cylinder made of Aluminum Alloy. Improves the quality of the bearing surface. An extremely smooth surface-finish is secured.



Aircraft Valve Tappet Roller. Honed after grinding to give 100% bearing surface.

284

Drive Down
Tool Costs
with . . .

Apex Sockets and Wrenches



Here's how you cut tool costs when you use Apex sockets and wrenches: **FIRST.** They are accurately machined from electric furnace high carbon alloy bars—cold broached and carefully heat treated to give maximum strength and shock resistance.

They are built to stand tremendous strains and shocks. **SECOND.** These sockets and wrenches can be furnished—on request—to definite hardness specifications for best service on specific jobs. **THIRD.** Apex sockets stay on the toughest jobs (self tapping screws, for example) much longer than ordinary sockets.

We're tooled up for speed and flexibility. Should you require a special wrench, send us sketch, blueprint or description and we'll quote promptly. Write for Catalog 18.

Female square drives: $\frac{1}{4}$ " — $\frac{9}{32}$ "
— $\frac{3}{8}$ " — $\frac{1}{2}$ " — $\frac{5}{8}$ " — $\frac{3}{4}$ " and 1"

APEX sockets

THE APEX MACHINE & TOOL CO., 1028 S. Patterson Blvd., Dayton 2, Ohio

Safety Friction Tapping Chucks; Quick Change and Positive Drive Drill Chucks; Vertical Float Tapping Chucks; Parallel Floating Tool Holders; Power Bits for Phillips, Slotted Head, Frearson and Clutch Head Screws; Hand Drivers for Phillips and Clutch Head Screws; Aircraft, Industrial Universal Joints; Sockets and Universal Joint Socket Wrenches.

Now, YOU CAN PICK THESE SEALED PACKAGE

POPE PRECISION GRINDING SPINDLES

Right off the shelf!

1.



POPE Sealed Motorised 6" x 16" Surface Grinder Spindle with sealed-in 1 HP motor and sealed lubrication. **SESP** super-precision, double row, roller bearings. Produces finer finishes. Roughs off surplus metal fast. Write for Data Sheet No. 12.

2.



POPE Motorised Spindle for Surface Grinders and Boring Mills with sealed lubrication and 3, 5 or 10 HP motor running at 1200, 1800 or 3600 RPM. Produces better final finishes. Increases production. Runs in any position. Write for Data Sheets 16, 17, 18, 19.

3.



POPE Wheel Head with sealed lubrication, for special grinding, boring and other operations requiring from 3 to 25 HP. May be mounted horizontally or at any angle. Designed to operate at whatever speeds meet your requirements. Write for recommendations and quotations.

4.



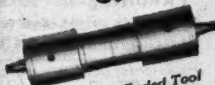
POPE Tool and Cutter Grinder Spindle with sealed lubrication. Operated by single Vee belt drive at speeds up to 6000 RPM. Fits standard grinders. Write for recommendations and quotations.

5.



POPE Internal Grinding Spindle with sealed lubrication. Comes in a wide range of sizes and speeds up to 35,000 RPM. Produces more accurate hole sizes and better finishes. Write for Catalog No. 56.

6.



POPE Double-Ended Tool and Cutter Grinder Spindle with sealed lubrication. Belt drive, with twin pulleys for two speeds, from stop pulley on motor. Speeds up to 6000 RPM. Fits standard grinders. Write for recommendations and quotations.

POPE

POPE MACHINERY CORPORATION

ESTABLISHED 1920

261 RIVER STREET • HAVERHILL, MASSACHUSETTS
BUILDERS OF PRECISION SPINDLES

parallel
ers for
nches.

1948

January, 1948

MODERN MACHINE SHOP 35

(A)

(B)

(C)

They're DIFFERENT -

They're KNURLED*

UNBRAKO

Reg. U. S. Pat. Off.

Knurling of Socket
Screws originated with
"Unbrako" in 1934.

(A) The knurled head of the "Unbrako" Socket Head Cap Screw makes it slip- and fumble-proof—be the fingers and heads ever so oily—therefore, it can be screwed in faster and farther before it becomes necessary to use a wrench. (B) The knurled cup point of the "Unbrako" Socket Set Screw makes it a *Self-Locker*—the point digs-in and *stays* dug—regardless of the most chattering vibration. (C) The knurling of this "Unbrako" Socket Set Screw, as shown, *swages* the threads so it becomes a most excellent Self-Locker—for use where the points such as: flat, dog, cone and oval do not lend themselves to knurling. Write for your copy of the "Unbrako" Catalog. "Unbrako" and "Hallowell" Products are sold entirely through Industrial Distributors.

OVER 45 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA. BOX 556 • BRANCHES BOSTON • CHICAGO • DETROIT • INDIANAPOLIS • ST. LOUIS • SAN FRANCISCO



Kits: Pats. Pend.

You can't screw socket screws in or out without a hex socket wrench, so why not get our No. 25 or No. 50 "Hallowell" Handle Key Kit which contains most all hex bits.

ABRASIVE No. 5AWF INTERNAL FINISHER

A NEW CARBIDE FINISHING MACHINE

The increasing use of carbides and similar materials for dies, gages, bushings, etc., has created an urgent need for an accurate machine to grind and finish such materials rapidly. The ABRASIVE MACHINE TOOL COMPANY, long an outstanding manufacturer of precision surface grinding machines, now presents the No. 5 AWF INTERNAL FINISHER, manufactured and sold under the Walter G. Wessman patents. This accurate machine, quickly set up for internal or external work, is capable of grinding and micro-finishing at one chucking several angles or combinations of straight and angular surfaces. The grinding action differs from previous methods in that surfaces are ground with a wide section of the wheel, utilizing a grinding action "across the work surface".

RECIPROCATING SLIDE

The finishing of carbides heretofore has been slow and hazardous due to the uncertain action of the grinding wheel. Now ABRASIVE makes available a patented reciprocating feature built into the wheel slide which causes the "hills" between the "valleys" to be eliminated, giving a much smoother finish and faster production. The increase in cutting speed is due to the tendency of the grains, under reciprocation, to wear thin and stay sharp. The reciprocating action puts more of the grains of the abrasive to work and prevents gouging by the wheel. Both the speed and length of reciprocation are adjustable for maximum efficiency.

Write for Bulletin

ABRASIVE MACHINE TOOL CO.

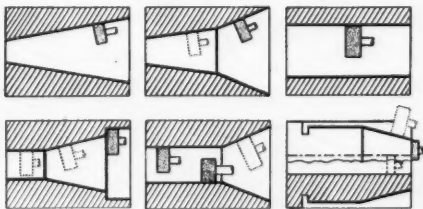
EAST PROVIDENCE 14, RHODE ISLAND, U. S. A.



MULTIPLE ANGLE GRINDING

ACCOMPLISHED IN ONE SET UP

The sketches show typical grinding operations performed at one setting of the ABRASIVE No. 5 AWF INTERNAL FINISHER. The unusual cutting action provided by the fast reciprocating wheel slide produces a microinch smoothness of 2 RMS or better without lapping, honing, or polishing.



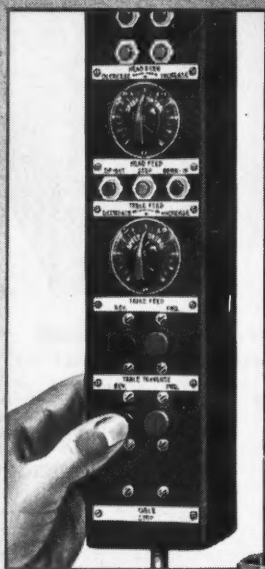
ABRASIVE

ACCURACY BOOSTS PRODUCTION

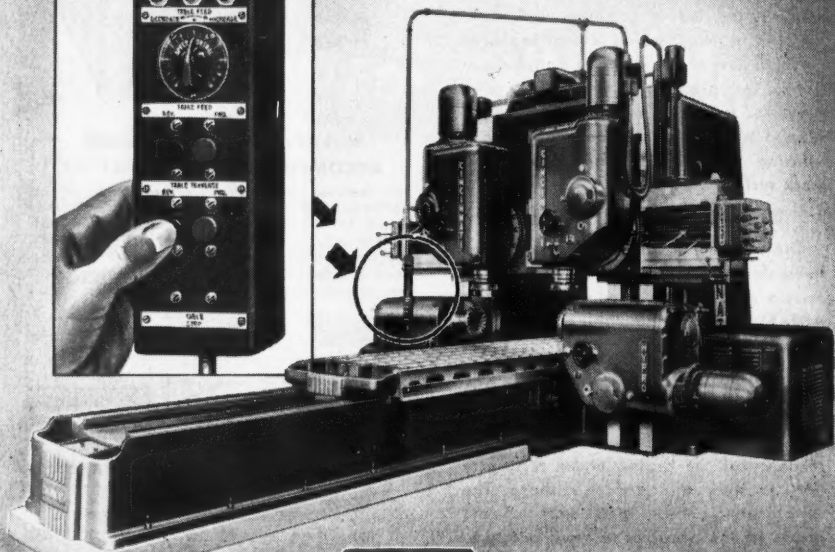
AN ENTIRELY **NEW** DEVELOPMENT...

Hypro-electronic

PLANER MILLER DRIVE



Operator starts and stops all feeds and rapid traverse. Also adjusts feed rates for all heads and table from pendant station. Eliminates all gears, clutches, and brakes.



THE CINCINNATI HYPRO PLANER COMPANY

PLANERS · BORING MILLS · PLANER TYPE MILLERS

CINCINNATI, OHIO

Add Safety to Your Kick Presses — With Air Power

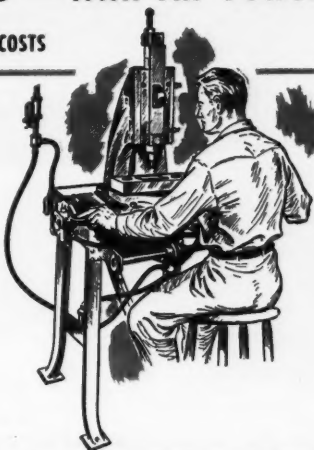
GET: MORE UNIFORM WORK • GREATER PRODUCTION • LOWER COSTS

SCHRADER PNEUMATIC MACHINE CONTROLS CONVERT
FOOT (KICK) PRESSES TO AIR-POWER HAND OPERATION

Foot (kick) press operators work faster, with less fatigue, greater safety . . . and turn out more uniform work when foot presses are converted to air-powered hand operation.

It's easy to change any standard kick press to air operation with Schrader Pneumatic Machine Controls. Schrader No. 2148 type Control has a lever type two-hand operating valve assembly with the Schrader Cut-Out Valve safety feature. This prevents operators from tying down either valve for one hand operation. If foot operation is desired, Schrader Foot Pedal No. 9586 can be obtained.

You can eliminate rejects caused by uneven blows, reduce costs and provide safer working conditions for your operators by installing Schrader Kick Press Controls now. Write for complete information today.



FREE!

Get your copy of this information-packed 8 Page Bulletin describing Schrader Air Control Products



**1001 INDUSTRIAL PRODUCTS
FOR EFFICIENT AIR CONTROL**

Schrader
MODERN
PRODUCTS
CONTROL THE AIR

WRITE FOR COMPLETE INFORMATION
TODAY ABOUT THESE AND OTHER
SCHRADER AIR CONTROL PRODUCTS



Air-Cylinders—all types

Quick-acting Air Couplers that
plug in for air supply

Operating Valves—2, 3,
and 4-Way

Blow Guns—Stainless Steel,
Drop-forged

A. SCHRADER'S SON, 474 Fourth-Ave. Avenue
Brooklyn 17, N. Y. Dept. 9885 187
Division of Sealed Manufacturing Company, Incorporated

Please send me your FREE BULLETIN and more information about the products I have checked in circles below.

NAME _____

COMPANY _____

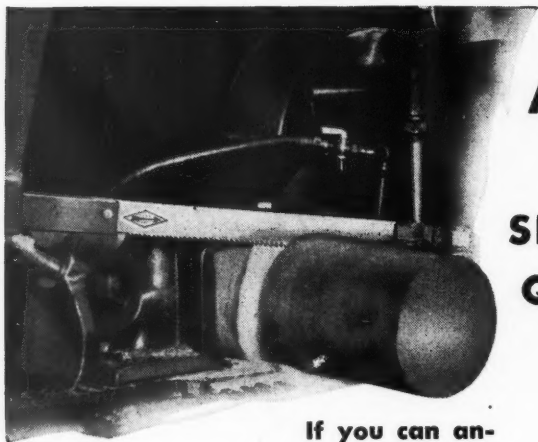
ADDRESS _____

CITY _____

STATE _____

- ☐ Air Cylinders
- ☐ Air Valves
- ☐ Press Controls
- ☐ Air Reaction Sets
- ☐ Blow Guns

- ☐ Air Line Couplers
- ☐ Air Hose & Fittings
- ☐ Hose Reels
- ☐ Hydraulic Gauges
- ☐ Air Pressure Regulators



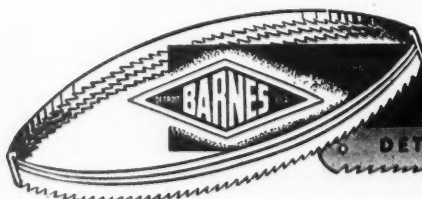
Can You Answer "Yes" TO THESE SIX IMPORTANT QUESTIONS?

If you can answer "yes" to all six, then you can be sure your production hack saws are operating most efficiently. The Barnes Hack Saw Production Calculator (free on request) has information that will enable you to answer "yes" to some of these questions; Barnes Service Engineers can give you the correct answers to all of them!

Why not let us match our top quality hack saw blade plus our knowledge of metal sawing against your cutting problems. Then you are assured your production power hack saws will deliver maximum cutting efficiency.

Your Barnes Distributor will have a Barnes Service Engineer call on you whenever you say—no obligation.

- 1 Am I obtaining maximum number of square inches cut per blade?
- 2 Am I using correct feed and speed to balance production against tool cost?
- 3 Do I use correct length and pitch of blade for size and type of material being cut?
- 4 Am I nesting materials in the most efficient manner?
- 5 Am I cutting my material in the shortest possible time consistent with normal blade life?
- 6 AM I USING THE RIGHT GRADE?



ESTABLISHED 1919

W. O. BARNES CO., INC.

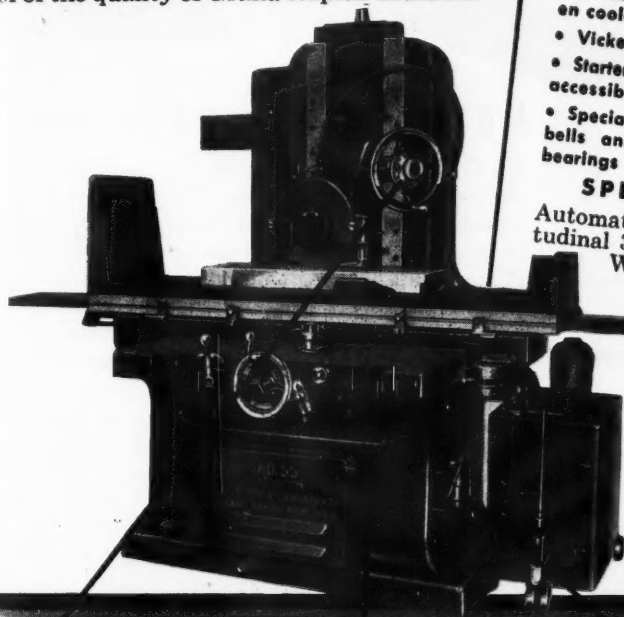
DETROIT 14, MICHIGAN

ROVEN PERFORMANCE

SELLS 6 OUT OF 10 GRAND RAPIDS GRINDERS

Of every ten Grand Rapids Hydraulic Feed Surface Grinders sold, six are to customers already using Gallmeyer and Livingston grinding machinery.

Such customer acceptance and approval is proof of the quality of Grand Rapids Grinders.



FEATURES

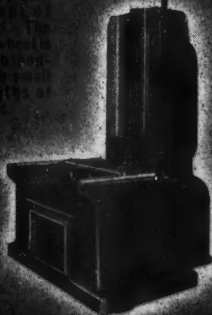
- 125 feet per minute longitudinal table speed
- Separate motors to drive grinding wheel spindle and hydraulic mechanism
- Two spindle speeds to reduce wheel costs
- Portable, self-contained motor driven coolant system
- Vickers vane type hydraulic pump
- Starters, controls and motors easily accessible
- Special G & L spindle motor end-bells and over-size precision ball bearings

SPECIFICATIONS

- Automatic table travel—longitudinal 38", transverse 13½"
 - Working surface of table—12" x 36"
 - Standard wheel size—12" x 1" x 3"
 - Vertical movement of wheel head—18"
 - Spindle speeds—1925 and 2500 RPM
 - Floor space—150" wide x 102" deep
- Write for Bulletin GL 101



Patented vertical adjustment of wheel head. The self-contained hydraulic feed mechanism is built into the main body of the machine.



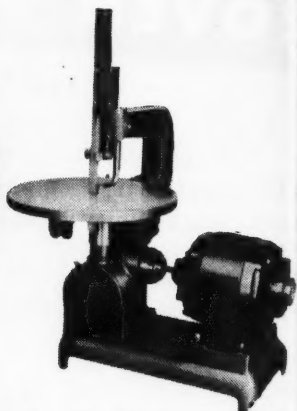
Heavy rugged cast-iron frame and base is very strong, supporting heavy grinding wheels and motor. The frame is built to last and is easily maintained.

Blair one-shot lubricating system insures long life for bearings, freedom from trouble and eliminates time spent in oiling.



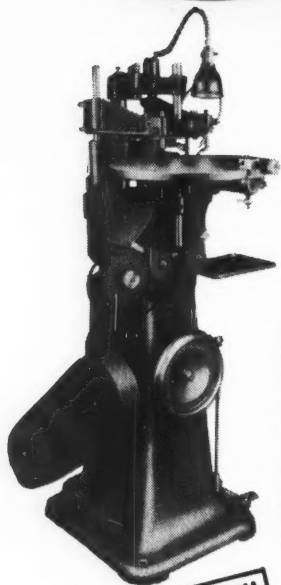
GRAND RAPIDS
GALLMEYER & LIVINGSTON CO.
GRAND RAPIDS, MICH.

**EVERY PLANT
NEEDS an OLIVER
DIE MAKING
MACHINE**



MOST PLANTS HAVE THEM

The Oliver is recognized as the foremost Die Making Machine in use today—This fact is substantiated by the thousands of machines in operation in plants of all sizes—Actual case histories have proven the Oliver cuts direct labor costs 50% to 60% over the old drill and chip method — The Oliver does not require a skilled die maker, ordinary mechanics can quickly learn its operation.



LEFT—HEAVY DUTY

This machine will saw and file metals up to 3" thick. Sawing can be handled up to 20" circle. 100 to 300 strokes. The 18" table tilts 15 degrees to front, left, or right. Constant controlled pressure feed. NO WORK SPOILAGE.—Sawcoil Magazine reduces tool costs.

ABOVE—BENCH TYPE

Extremely accurate for sawing, filing, and lapping tool steels up to 1" thick . . . 8 1/2" throat permits working to center 17" circle . . . 11" table tilts 10 degrees right, left and forward. (Special overarm available for greater capacity.)

**IMPROVE YOUR TOOLROOM
IT'S THE BACKBONE
OF PRODUCTION**

Send for Illustrated Bulletin

OLIVER INSTRUMENT CO.

1430 E. MAUMEE ST.

ADRIAN, MICH.

**OLIVER
OF ADRIAN**

AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS DRILL
POINT THINNERS TEMPLATE
TOOL GRINDERS FACE MILL
GRINDERS—DIEMAKING MACHINES

EM

Mak-
stan-
ation
have
% to
- The
ord-
on.

saw-
g tool
. 8 1/2"
o cen-
table
ft and
er arm
capa-

D.
MICH.

ERS
DRILL
LATE
MILL
CHINES

, 1948



MEET THE *New* ROTOR SCALER

It is a rugged little 3 pounder with a heavy-
weight wallop . . . the Rotor S-1 Scaler. Try it on
these production and maintenance jobs:

- Weld slag removal • Spatter cleaning •
- Weld peening • Rust or paint scaling •
- Star drilling • Light chipping •

how it cuts your costs.



Call in the Rotor Analyst to demonstrate the
new Rotor Scaler on your work. See how easy
the operator can control the blow . . . how its
swivel head allows flexibility in handling and
its positive chisel retainer assures safe operation
and fast work in tight corners. Ask for
free copy of Bulletin 33.

THE ROTOR TOOL CO.

CLEVELAND, OHIO

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS



Mark It for Market

MODEL
175
HYDRAULIC



Modern Marking Machines now enable most manufacturers of metal components to identify their products at trifling cost.

**TRADE MARKS—
MANUFACTURERS—
PART NUMBERS—
PERMANENTLY ROLLED
ON YOUR PRODUCTS
WILL HELP YOU MARKET
THEM.**

Send prints of parts, showing required marking and its location on part with hourly production for free recommendation.

*Illustrated at the left is
Model 175 Hydraulic
Marking Machine.*

WRITE FOR CATALOG



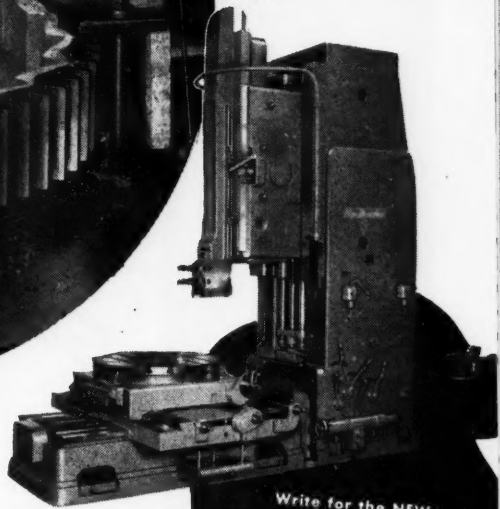
GEO. T. SCHMIDT, INC.

**1806 W. BELLE PLAINE AVE.
CHICAGO • 13 • ILLINOIS**

Typical Rockford Hy-Draulic Slotter job . . . cutting ratchet teeth on large gear for ladle crane. The three types of Hy-Draulic power feed available on all Rockford Slotters were used . . . longitudinal, transverse and rotary; in addition the rotary motion for tooth spacing was indexed by the dividing head. Material cut was .55 carbon cast steel.



**FAST .
SET-UP
ALWAYS**

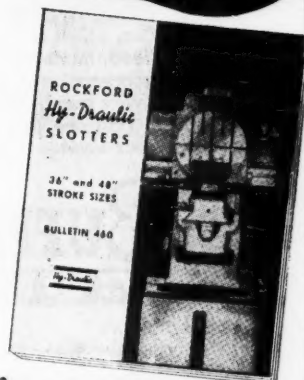


Write for the NEW
**36" and 48" Hy-Draulic
SLOTTER BULLETIN
No. 460**

Rockford Hy-Draulic advantage

Whether you require a Shaper, Planer, or the 36" Slotter illustrated above, fast set-up is an advantage you will obtain with every Rockford Hy-Draulic machine. Hydraulic design results in simplified positive controls . . . in ram or table travel that is accurate and immediately responsive to the machinist's needs. The time saved in set-up is one of the important economies provided by all Rockford Hy-Draulic machines. In addition you always have the advantages of wide range, infinitely variable speeds and feeds . . . and the smoothly applied power of the Hy-Draulic system for fine finish on work and protection to tools. Write for complete information on the Rockford Hy-Draulic Shapers, Planers, Slotters, and Shaper-Planers. Ask for Catalog 1947.

**ROCKFORD MACHINE TOOL CO.
ROCKFORD ILLINOIS**



4719

Hy-Draulic

REG. U.S. PAT. OFF.

SHAPERS

PLANERS

SLOTTERS

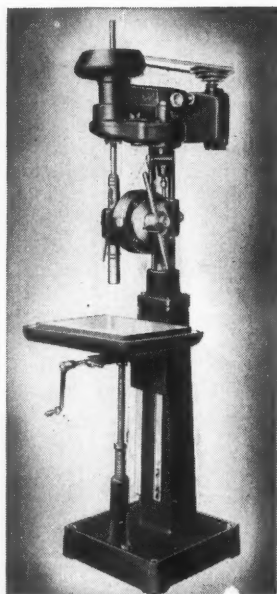
SHAPER-PLANERS

FOR LOWER MANUFACTURING COSTS

YOU'LL CUT DRILLING COSTS

with

*"Sensitive
Sixteens"*



If you drill in the range from $\frac{7}{8}$ " down, here is just the "extra service" tool to give you the most holes per drilling dollar. The "Buffalo" No. 16 Drill has fast speed adjustments from 400 rpm up to 3,000 rpm. Three sizes, 16", 24"

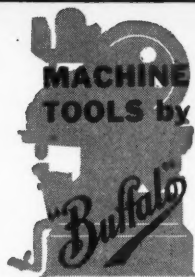
and 30" swing, available in bench and pedestal types—featuring an efficient coolant system; power as well as sensitive feed; moderate cost and numerous combinations to fit your operational needs. And deliveries on the Sixteens are very good. Better send for your copy of Bulletin 2730 now, and see how these accurate, adaptable drills can cut your costs.

BUFFALO FORGE COMPANY

388 BROADWAY

BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.



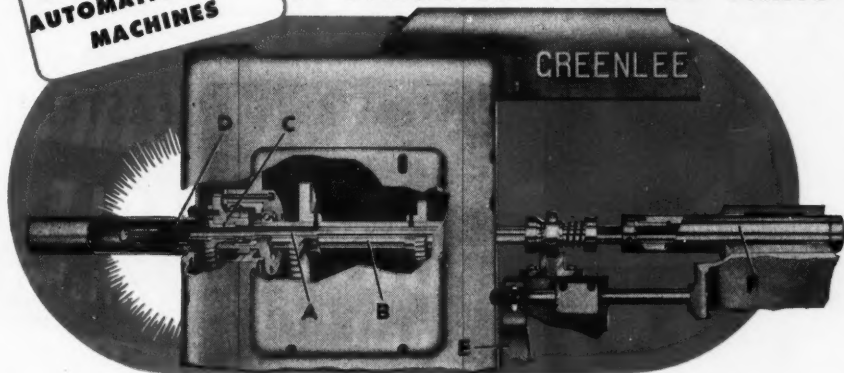
- ★ BACK SPOT FACERS
- ★ BAR CUTTERS
- ★ BENDING ROLLS
- ★ BILLET SHEARS
- ★ DOUBLE END PUNCHES AND SHEARS
- ★ LOCOMOTIVE SHEARS
- ★ MILL TYPE SHEARS
- ★ RAPID ACTIVE PUNCHES
- ★ SINGLE END SHEARS
- ★ SPRUE CUTTERS
- ★ STRUCTURAL IRON WORKERS
- ★ UNIVERSAL IRON WORKERS
- ★ DRILLS FOR THE PRODUCTION LINE—
DRILLS FOR THE TOOL ROOM

CONTINUOUS SERVICE—FASTER OPERATION—PEAK ACCURACY

New
LEAD-SCREW
FEED
ON GREENLEE
AUTOMATIC SCREW
MACHINES

*Speeds
Production*

OF PRECISION-THREADED PARTS



Cut-away of Greenlee Screw Machine showing combination cam-and-lead-screw-operated threading spindle in 5th position

7 Cost-Saving Features

- Cuts costs of producing parts requiring precision threads.
- Positive lead-screw feed insures uniform high-quality results.
- Reduces scrap losses.
- Simple design plus interchangeable feature cuts equipment and re-tooling costs.
- Increases work handling capacity.
- Quick and easy adjustments save set-up time.
- Easily adapted to old machines at nominal cost

NO SPECIAL CAMS OR SPEED GEARS REQUIRED — SIMPLE DESIGN SAVES TIME AND MONEY...

Here at last is a screw machine development offering an economical solution to the problem of cutting precision threads at production speeds. This new cam-and-lead-screw-operated threading arrangement for the Greenlee "6" gives a rapid approach, accurate threading-in and threading-out, and a quick withdrawal. It speeds production and insures a uniform, high-quality thread with a very accurate lead.

As illustrated, the Threading Spindle Drive Shaft "A", which is driven by Splined Sleeve "B", is relieved of splines at its outer end. Driven at a constant speed, bronze Lead-Screw Nut "C" engages precision Lead Screw "D" to produce the necessary lead. Cam-operated Lever "E" handles the rapid approach and quick withdrawal. Precise adjustments for depth are made by setting Spindle "F" on the threaded Drive Shaft "A".

Economical To Use — Completely Interchangeable

To cut threads with different taps or chasers, it is only necessary to change the easily-removed lead screw and nut. Lead screws and nuts with different leads can be made to order in your own tool room and are easy to store. Thus, a wide variety of work can be handled, quickly and economically. Lead-screw threading operations can be handled in 3rd, 4th, and 5th positions. In addition, by simply removing the lead screw and nut, the Greenlee "6" can be quickly changed-over to handle ordinary jobs. No special cams or speed gears are required.

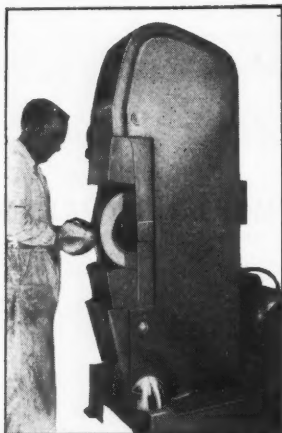
WRITE FOR DETAILS TODAY

Get facts on how you can speed up production, reduce scrap losses, and increase your work handling capacity with a Greenlee "6". Conversion parts are available for all Greenlee Sixes now in use. To avoid delays, write now for full details.

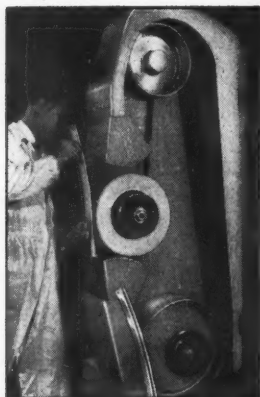
GREENLEE BROS. & CO.
1881 MASON AVENUE
ROCKFORD, ILLINOIS



MULTIPLE SPINDLE DRILLING, BORING, TAPPING MACHINES • AUTOMATIC SCREW MACHINES • AUTOMATIC TRANSFER PROCESSING MACHINES



Hand operation—job held in spinner.



As easy to use as a back-stand polisher or grinding jack.

Contact wheel can protrude just the right amount for properly presenting the work. Full latitude for manipulating a piece to grind long flats, catch corners, do the ends, etc.

Write Today



for the new manual on grinding and polishing. It's free. Ask for the film: Machine of the Age. Loaned FREE for staff meetings.

Make **MORE PROFITS** on contour grinding flat-face grinding, polishing

**One machine does them all
Easier! Better! FASTER!**

PORTER-CABLE C-6 Belt Grinder-Polisher

The NEW C-6 eliminates costly set-up time and wheel dressing . . . reduces fatigue . . . cuts polishing time by 30% to 50% . . . improves finish and quality . . . grinds a larger variety of shapes in less time.

For flat-face grinding or polishing you merely use the unshaped contact roll.

For contour grinding the shape you want is easily turned into the sisal-latex material of the contact roll. The belt drapes itself into the contour.

The *Contact Roll* holds its shape indefinitely. Runs true, since it is not on the drive pulley. Not shaken by motor vibration. Is adjustable to travel the belt at any angle up to 15° off tangent. This makes possible a large variety of shapes and contours.

Abrasive Belt is evenly loaded . . . does not over-heat . . . actually does all the cutting work. Does not require dressing . . . easily replaced in a few minutes.

**Every shop needs this new money-maker!
The New C-6!**

PORTER-CABLE

MACHINE CO.

300-1 Wolf St.

Syracuse 8, N.Y.

CUT A FEW KEYWAYS

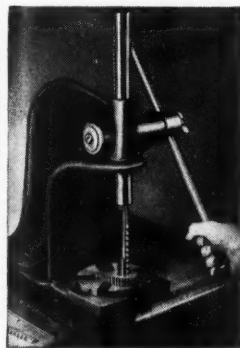
IN GEARS, CUTTERS, COUPLINGS,
COLLARS, PULLEY HUBS, etc.

AND YOU'VE PAID FOR THIS KIT!

MINUTE MAN Keyway Broach Kit

cuts any size keyway, by hand

IN ONE MINUTE!



Here's a set of fine tools that you'll be proud to own — and that's worth its weight in gold every time you have a keyway to cut.

The **MINUTE MAN** Kit and a du Mont Arbor Press give you everything you need to cut a clean, accurate keyway in sixty seconds.

ACT NOW! You're losing time and money every minute you spend cutting keyways by obsolete, expensive machine methods. You need the Minute Man.

YOUR NAME and address on a penny postcard will bring you the name of the nearest Minute Man Mill Supply Distributor and copy of new Descriptive Folder and Price List. S.

**The du MONT
CORPORATION**

GREENFIELD, MASSACHUSETTS

RACINE

Announces

New! VARIABLE VOLUME OIL HYDRAULIC VANE TYPE PUMP

OUTSTANDING FEATURES

ADJUSTABLE VOLUME — Pump can be set to deliver exactly the proper volume of oil for any given job.

ACCURATELY BUILT — All parts precision made. Accurately ground vanes of special steel are self-compensating for wear. Rotor shaft mounted in anti-friction bearings. Entire pump is self lubricated.

LOW COST — Quantity production and standardization of parts make possible low cost that compares favorably with constant volume non-adjustable pumps.



ANOTHER RACINE HYDRAULIC ACHIEVEMENT—the new Model J Variable Volume Oil Hydraulic Pump. Compact Vane Type design allows installation of this pump in a space as small as 6" x 6". It will deliver 1000 pounds pressure per square inch and will maintain a 90% volumetric efficiency.

Variable Volume feature allows horsepower requirement of system to be held to demands of the maximum load. Racine Hydraulic engineers welcome the opportunity to review your needs and make recommendations for complete hydraulic circuits. Write for Catalog P-10-C. Address RACINE TOOL AND MACHINE CO., 1770 STATE ST., RACINE, WISCONSIN.

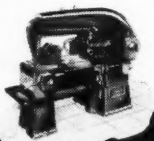
OTHER RACINE HYDRAULIC PUMPS

Variable Volume Pumps with either manual, mechanical hydraulic or electrical volume control are available in capacities to 30 g.p.m. at pressures of 50 to 1000 lbs. p.s.i.

Four-Way, Balanced-Piston Sleeve-Type hydraulic valves are also available in a wide range of styles and portings. Sizes $\frac{1}{8}$ " to $1\frac{1}{2}$ " I.P.S., lever, foot, pilot or solenoid operated.

RACINE Hydraulic METAL CUTTING MACHINES

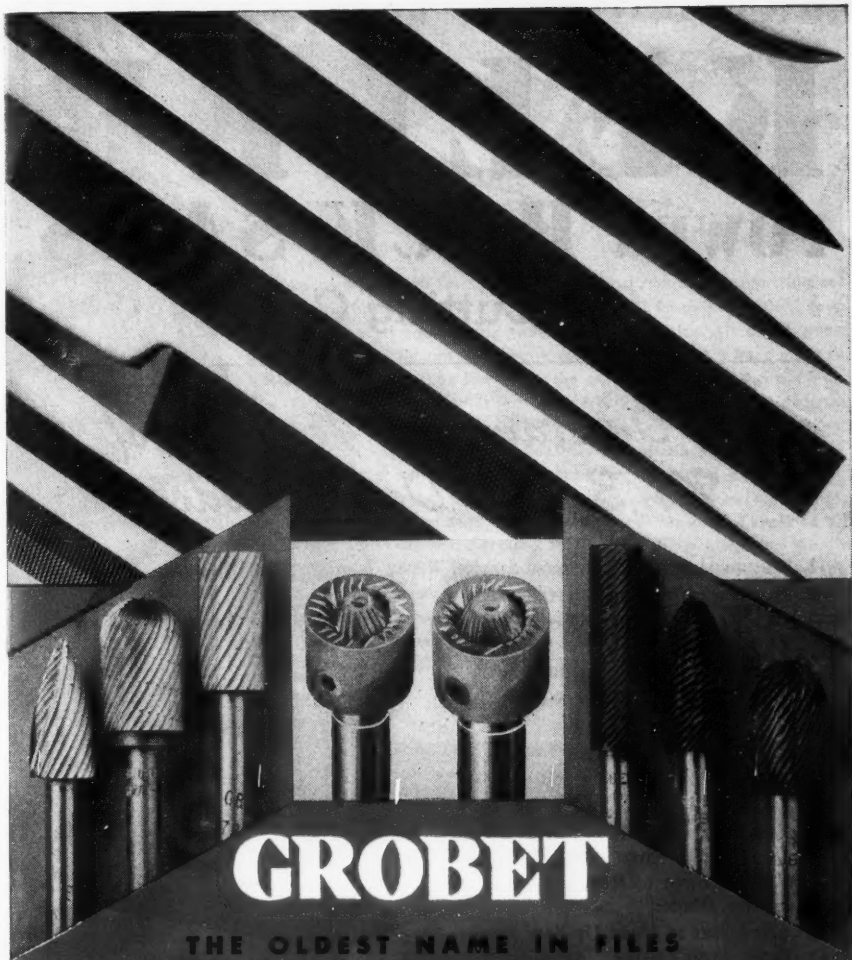
If you have a metal cutting job whether it be soft aluminum or hard tool steel, tubing or bar, Racine has a saw in its complete line that will do the job. Sizes range from 6" x 6" to 20" x 20". Ask for catalog No. 12.



RACINE TOOL AND MACHINE CO.

RACINE, WISCONSIN

Standard for Quality and Precision



GROBET

THE OLDEST NAME IN FILES

Where precision and accuracy is required GROBET only, assures the finest workmanship, performance and durability—that's why such undisputed leadership has been maintained for 135 years.

Ask your supply house or, if none near, let us know your specifications on GROBET PRECISION genuine SWISS, and AMERICAN PAT-
TERN FILES, RIFFLERS, ROTARY FILES, BURS,
TUBE DEBURRING REAMERS, COUNTERSINKS,
ETC.—nearly 10,000 shapes, sizes, and cuts.

ANY GROBET and not the file you need for a specific purpose—
our catalogue or write us today.

GROBET FILE CO. of AMERICA Inc.

421 Canal Street



New York, 13 N. Y.

IMPORTERS OF GROBET SWISS FILES

MFRS. OF GROBET ROTARY FILES

Plants: New York • Chicago • Los Angeles

January, 1948

MODERN MACHINE SHOP 51

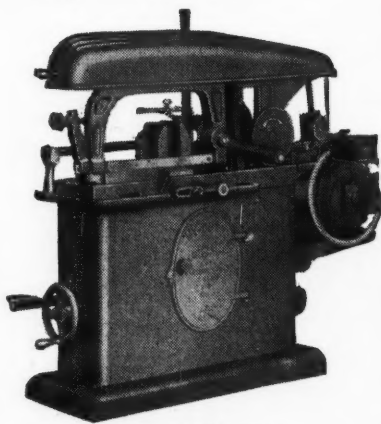
KELLER

POWER HACK SAWS

Cut Cutting Costs

12 Outstanding Features of No. 3 Hy-Duty Model

1. Automatic Lift for Reverse Stroke.
2. Automatic Stop and Start Switch.
3. Self Priming Chip-proof Coolant Pump.
4. Coolant Tank Cast in Base.
5. Heavy Swivel Jaw and Swivel Base Vise.
6. Heavy Box Type Saw Frame.
7. Special Saw Blade Tension Lever.
8. Stream Line Saw Frame Guard.
9. Foot Pedal to Raise and Lower Saw Frame When Loading.
10. Feed Control to Regulate Pressure of Saw Blade.
11. Safety Bar to Hold Up Saw Frame.
12. Stock Stop Gauge.



No. 3 HY-DUTY

YOU CAN RELY ON KELLER POWER HACK SAWS
BETTER PERFORMANCE ——— LONGER LIFE

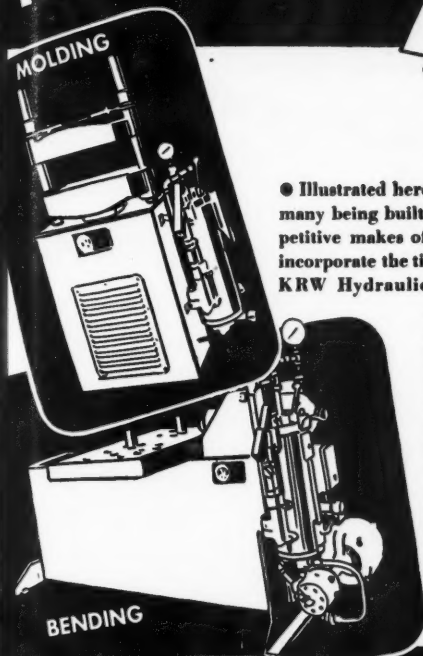
Several other models available.

SEE YOUR LOCAL DEALER OR WRITE DIRECT TO DEPT. M-148

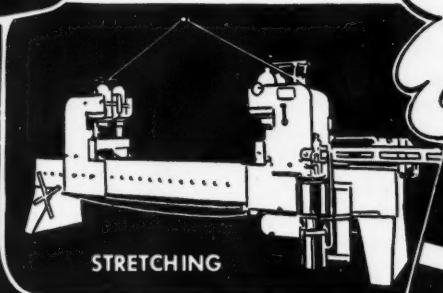
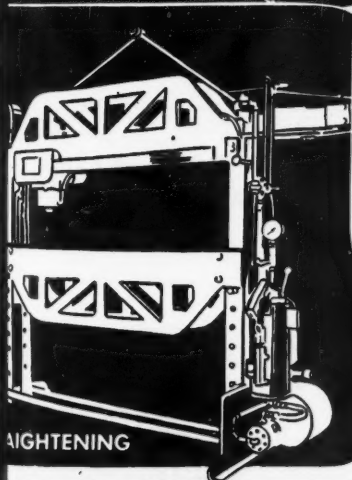
Sales Service Machine Tool Co.
2363 UNIVERSITY AVE. ST. PAUL 4, MINNESOTA

Name the JOB!

There's a **KRW PRESS** that can do it **BETTER...for LESS**



● Illustrated here are four KRW Hydraulic Press adaptations that are typical many being built by KRW today. All are priced from 30 to 200% less than competitive makes of comparable tonnages or capacities. All are motor-driven and incorporate the time and production proven features that have made the standard KRW Hydraulic Arbor Presses...the most widely used press of their type in America. Take the KRW Sliding Head Straightening Press as an example. This type KRW Press has been effecting tremendous labor savings in fabricating plants where plate must be "true up" before it is processed or fabricated. The heavy, hand method formerly used was archaic and very costly by comparison. The same story holds true of KRW Stretcher-Levellers, KRW Bending and Forming Presses, KRW Compression Molding Presses, KRW Bending Presses and many others. To save your time and ours, tell us your problem in terms of what you want to accomplish. We'll give you an answer and furnish literature that is pertinent to your needs. Mail the coupon now.



Write for the
**NEW
KRW
Catalog.....**



K. R. Wilson, 215 Main Street, Buffalo 3, N. Y.

Please send your catalog. We are particularly interested in your

Bending Presses ☐ Compression Molding Press ☐
Straightening Press ☐ Stretcher-Leveller ☐ Forming and
Blanking Press ☐

Firm Name

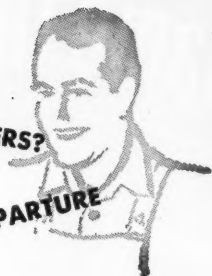
Address

City and Zone State

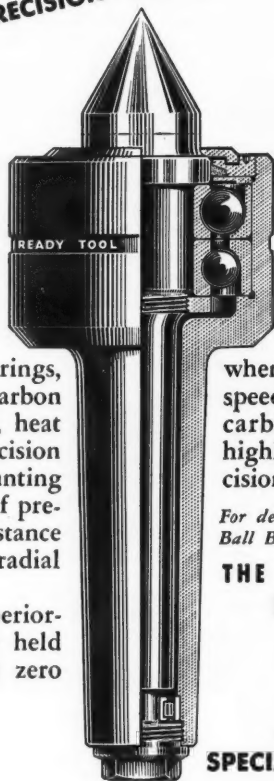
K·R·WILSON

15 MAIN ST. - BUFFALO 3, N. Y.

MORE ACCURATE BALL BEARING CENTERS?



**YES, RED-E CENTERS WITH NEW DEPARTURE
DUPLEX BEARINGS MEAN
TOP PRECISION BECAUSE . . .**



. . . New Departure bearings, constructed of high carbon chrome steel, are forged, heat treated and finished to precision tolerances. Duplex mounting provides definite degree of pre-load . . . maximum resistance to deflection under heavy radial and thrust loads.

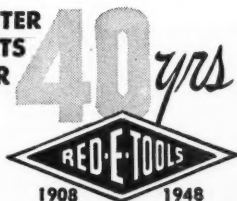
A RED-E feature of superiority that assures accuracy held within .0001" and point zero

when you work with the higher speeds and feeds required for carbide cutting tools. Also highly recommended for precision grinding.

For detailed engineering facts on RED-E Ball Bearing CENTERS, write Dept. A

THE READY TOOL COMPANY
Bridgeport 5, Conn.

**CENTER
SPECIALISTS
FOR**

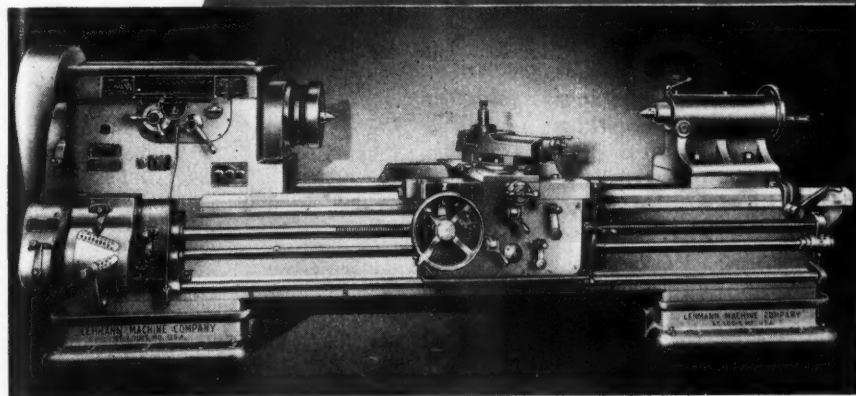


1RT48



"Lehmann is the Leader in Progressive Engine Lathe Design!"

... say hundreds of machine
shop superintendents



Here's the Standard **HYDRATROL**

HEAVY DUTY 22"-25"; EXTRA HEAVY DUTY 32"-36"

In hundreds of plants, under all sorts of conditions, **HYDRATROL** Heavy Duty Lathes are setting new records for speed, accuracy, dependability, economy. They operate with almost unbelievable smoothness, and do extremely close tolerance work. You'll do it better on a **HYDRATROL**!

CHECK THESE 8 IMPORTANT FEATURES:

- ★ Hydratrol Headstock, the outstanding achievement in lathe design.
- ★ Ample Capacity for the Heaviest Work.
- ★ Hydraulically-Operated Automatic Speed Changes.
- ★ Automatic Slide Rule Indicates Spindle and Cutting Speeds.
- ★ Hydraulic Friction Clutches and Brakes Require No Adjustment.
- ★ Start, Stop and Reverse Controlled from Headstock and Apron.
- ★ 16 Forward and Reverse Spindle Speeds.
- ★ Extreme Simplicity and Safety of Operation—

WE ALSO MAKE THE FAMOUS HOLLOW SPINDLE HYDRATROL—18" TO 36"

Send Us Prints of Your Difficult or Too-Costly Machining
Jobs for a Specific, Time-and-Money-Saving Recommendation

LEHMANN Machine Company

CHOUTEAU AT GRAND • SAINT LOUIS 3, MISSOURI

STOP DUSTS

With Low Cost Individual
DUSTKOPS

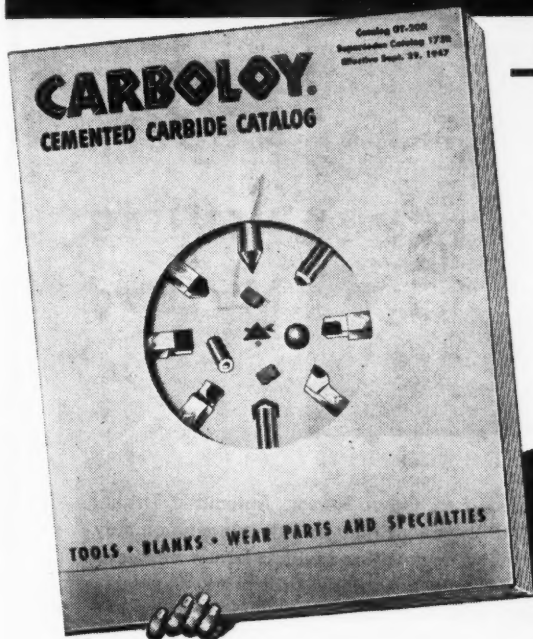
Dustkop *Vapor* Collectors stop mist and vapor from thread grinders, screw machines with the same low cost efficiency that Dustkop *Dust* Collectors stop dust and lint from grinding, polishing and buffing. They save heat. They also reduce colds.



AGET-DETROIT COMPANY
207 Main at Washington
ANN ARBOR, MICHIGAN

Send For
Catalog A-415
Now.

NOW! Easy to order STANDARDS



—for 60% to 80%
of your
machining!



THIS new Carboley Catalog lists over 600 standard low-cost blanks, tools, wear parts, specialties!

- Over 80 standard cutting tools for general-purpose use—
- Over 60 standard boring tools—
- Over 180 standard tool blanks—
- Over 300 standard wear-resistant blanks!

Sixty-four pages of information will help you use Carboley Cemented Carbides to cut expenses, increase production, improve your product.

CARBOLOY®
CEMENTED CARBIDE

Specifications of all standards and suggested uses are given.

It's a reference book—to help you get the best results through greater and more profitable carbide tool use. Send for your free copy today.



"Standards" are stocked by authorized distributors in 80 cities coast to coast.

CARBOLOY CO., INC.

11143 E. 8 Mile Blvd., Detroit 32, Mich.

Please send new, 64-page Carboley Catalog GT-200.

NAME _____ TITLE _____
COMPANY _____
STREET _____
CITY _____ ZONE _____ STATE _____

Output Nearly Tripled



by Modern Drilling Method

IN the operation illustrated, two Govro-Nelson Automatic Drilling Units, equipped with 7/32" drills, are drilling and countersinking stay-bolts at the rate of 100 per hour, as compared with a former maximum production rate of 35 per hour with a 4-spindle drill press. This is but one of the many case histories in our files showing how Govro-Nelson Units are cutting production costs by the simple method of making possible a greater daily output per man in the performance of drilling operations.

Send for literature giving the output figures on a wide variety of drilling jobs. It may well be that they will help you solve your own particular drilling problems.

WRITE FOR
Literature

GOVRO-NELSON CO.

*Machinists of Precision Parts
for 25 Years*

**1933 Antoinette
Detroit 8, Mich.**

Automatic

DRILLING UNIT



**WHEN YOU NEED
ONE STEEL BAR
or a truckload**



... you'll get immediate attention—and action — from your nearby Union Drawn Distributor. Every steel bar

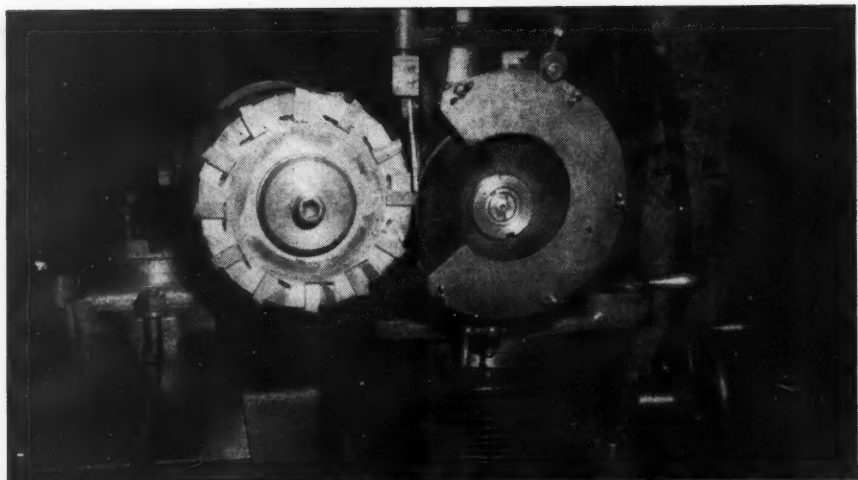
and shafting order—large or small —is important to him.

He has built his business on service — on speedy, dependable delivery of cold drawn steels from his well-

filled racks. And, his entire organization is trained and equipped to follow through on both your normal and emergency requirements.

Whether you need one bar—a dozen —or a truckload—call your nearby Union Drawn Distributor **FIRST**. While you're at it, tip him off to future needs, too. That way, you can help him give you even better service.





For the **HARDEST GRINDING**

MANHATTAN DIAMOND WHEELS WILL NOT LOAD OR GLAZE

Exclusive Manhattan bonding also permits the grinding of soft or hardened steel shanks in conjunction with grinding carbide inserts without loading or glazing. *No dressing. Greater economy.*

Unexcelled for precision grinding of Carbidés on surface, cylindrical or internal operations. Amazing results in grinding quartz, synthetic sapphire and glass.

DIAMOND WHEEL DEPARTMENT



RAYBESTOS-MANHATTAN INC.

Keep Ahead with Manhattan

MANHATTAN RUBBER DIVISION

PASSAIC, NEW JERSEY

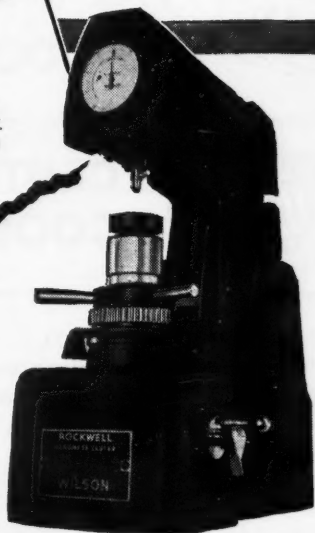
**"ROCKWELL"
HARDNESS TESTER**
Made Only by Wilson

HARDNESS is not a FUNDAMENTAL STANDARD

Fundamental standards—length, mass and time—are determined by comparison with measurements set by statute. There are no such "standards" to measure hardness. But . . .

After a "ROCKWELL" Hardness Tester leaves our Standardizing Laboratory, it is perfectly capable of setting and maintaining its own standard, according to the universally accepted "ROCKWELL" Hardness scale.

Remember, the "ROCKWELL" Hardness Tester is made only by Wilson. And Wilson makes only hardness testers.



WILSON

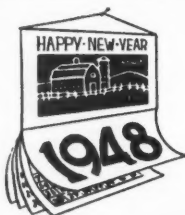
ACCO

MECHANICAL INSTRUMENT CO., INC.

AN ASSOCIATE COMPANY OF AMERICAN CHAIN & CABLE COMPANY, INC.

230-G PARK AVENUE, NEW YORK 17, N. Y.





TIME NOW TO GET THE RIGHT ANSWER TO COOLANT PROBLEMS



CENTRIFUGAL COOLANT PUMPS

WORK MUST BE KEPT COOL . . . that's one law you
daren't violate if you want to get results in your
machining . . . and the proper coolant flowing
through these time-tested, precision-produced pumps
will do the trick . . . every
time.

Better Finishes



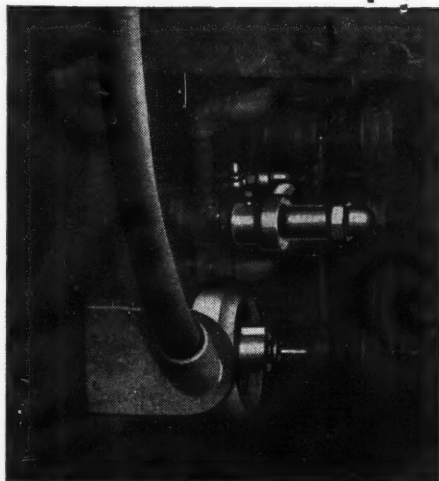
Lower Cost



Longer Life of Tools



*A request on your letterhead
will bring your personal copy of
FULFLO Mechanical Data Book.*



Specialties Co., Inc.
BLANCHESTER, OHIO

PERFORMANCE
IS BUILT
INTO
NATIONAL
METAL
CUTTING
TOOLS

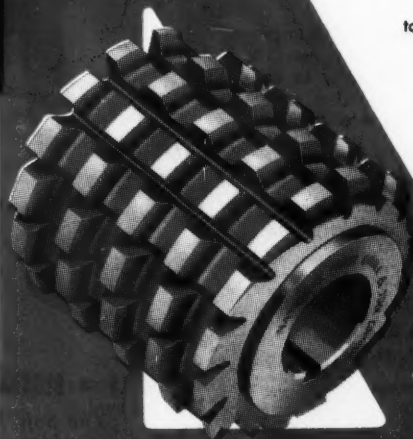
ENGINEERING *Design*

Here at National, engineering design is based on practical field experience. National field engineers continually make performance tests, on every kind of material and under all conditions. In the modern, fully-equipped National laboratories, these tests and this experience are translated into concrete tool design. When you specify National rotary metal cutting tools, you get tools that incorporate all of the latest advances in the art of metal cutting.



*Call Your
Distributor*

LEADING DISTRIBUTORS EVERYWHERE offer complete stocks of NATIONAL Cutting Tools. Call them for cutting tools or any other staple industrial product.



This Spline Shaft Hob is part of National's complete line of rotary metal cutting tools. National also

manufactures Twist Drills, Reamers, Milling Cutters, Counterbores, End Mills, and Special Tools.

NATIONAL

TWIST DRILL AND TOOL COMPANY

ROCHESTER, MICHIGAN, U. S. A. Tap and Die Division — Winter Bros. Co.
Distributors in Principal Cities • Factory Branches: New York • Chicago • Detroit • Cleveland • San Francisco



**Rubber-and-Abrasive
IN ONE
Does Four Operations
IN ONE**

*Burring • Smoothing
Finishing • Polishing*

Brightboy's unique combination of rubber-plus-abrasive simultaneously **BURRS, FINISHES, CLEANS and POLISHES.**

This one, all-inclusive, precision operation bridges the gap between the grind and the buff, not only in conventional finishing, but also where special surface effects are required.

★ Ask your dealer for the Brightboy catalog-manual and prices.

★ Write for a Brightboy service engineer to call and help you in production planning; in methods setups.

BRIGHTBOY INDUSTRIAL DIVISION

**Weldon Roberts Rubber Co.,
Newark 7, N. J.**



WHEELS • BLOCKS • RODS • TABLETS

*The Soft Rubber Binder
Cushions The Abrasive*

Why Pay This Much.....



For 4 Operations ...

BURRING FINISHING POLISHING SMOOTHING



*When Only This... Gives You ALL-IN-ONE
with Brightboy*



WINTER BROTHERS TAPS ARE DEPENDABLE!



QUALITY CONTROL



ALWAYS AT YOUR SERVICE

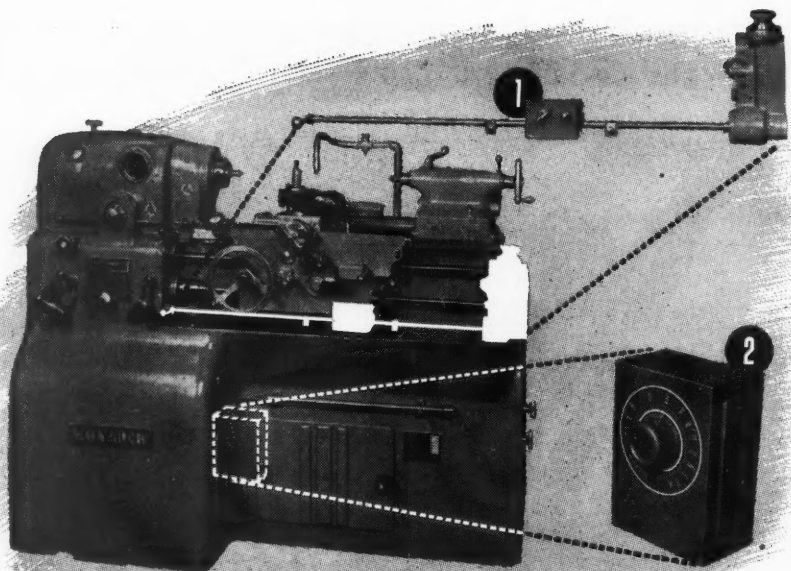
YOUR LOCAL DISTRIBUTOR carries a complete stock of WINTER Taps on his shelves—as close to your tapping problems as the telephone on your desk.

QUALITY control is one reason you get better performance and longer tool life when you specify Winter Taps. Winter's modern heat treating equipment includes automatic time and temperature controls that leave no important operation dependent on the human element. The quality of Winter Taps is safeguarded by rigid inspections at every step in the manufacturing process. Winter quality control is your assurance of more dependable performance always.



Winter Brothers COMPANY

ROCHESTER, MICH. and WRENTHAM, MASS. • Distributors in Principal Cities
A Division of the National Twist Drill and Tool Company • Branch Offices: San Francisco, Chicago, Detroit



TWO REASONS WHY you can chase threads UP TO 50% FASTER on a MONARCH

1—ELECTRIC LEAD SCREW REVERSE, for chasing either external or internal threads, has two features exclusive in the Monarch design. First, work rotation automatically stops at the end of each cut. Second, the mere twist of a convenient knob adapts the mechanism to chase either right or left-hand threads.

With the electric lead screw reverse you'll be able to chase more accurate threads—and you'll be able to do it faster.

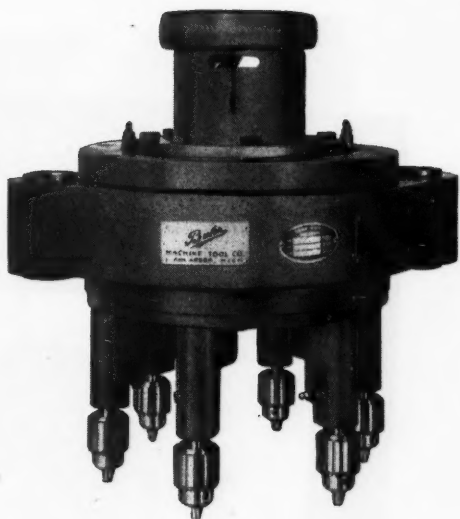
2—VARIABLE REVERSE SPEED CONTROL, mounted on rear of machine, gives even greater speed in the operation of electric lead screw reverse by *greatly accelerating* the return of the threading tool for the start of the next cut—an *exclusive Monarch feature*.

Regardless of the nature of your metal-turning needs, Monarch is ready with the latest designs, to give you peak production at a profit. May we talk it over?



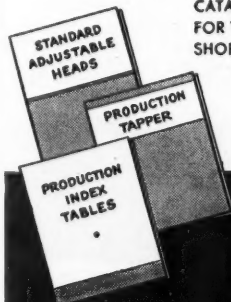
THE MONARCH MACHINE TOOL CO. • SIDNEY, OHIO

"Beefed Up" for PRODUCTION Drilling and Tapping



Buhr Standard Adjustable Drilling and Tapping Heads are engineered and built to deliver production at low unit cost. Fully adjustable, 2 to 8 spindles, for short or long runs. Rapid set up, models for all presses. Anti-friction bearing throughout; all gears shaved, spline-broached, induction hardened. Shafts and spindles splined. No corners cut in design, materials or workmanship.

Model 06-F-2 shown with No. 2 Jacobs Chucks also is available with spindles for Buhr Collets or with No. 1 Morse Taper. Drill capacity is 5/16", cast iron, minimum between centers, 1 1/2". Buhr steel-bushed guide-bar bosses illustrated are available for precision alignment with fixture.



CATALOGS
FOR YOUR
SHOP LIBRARY

Buhr builds all types of special fixed center, multiple heads for HIGH production under severe operating conditions.

BE SURE...

Specify Buhr!

Buhr MACHINE TOOL CO.

845 Green Street • Ann Arbor, Mich.

A BUYING GUIDE FOR ABRASIVES

ABRASIVE PROBLEM: Getting Authentic Information

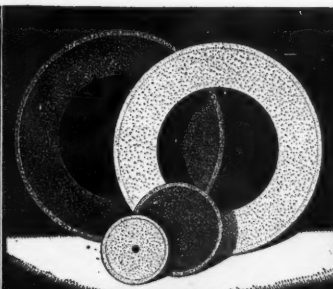


ANSWER BY
CARBORUNDUM
TRADE MARK

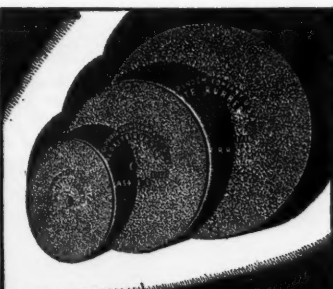
Being so closely identified with the development and progress of abrasives, it is natural that The Carborundum Company should be the source of so much authoritative literature on their application, care, and handling. Certain highly successful concerns regard the helpful service of technical and engineering literature supplied by The Carborundum Company as a significant point in their preference for abrasives by CARBORUNDUM. Ask your Carborundum representative for literature and bulletins related to your own grinding and finishing operations. The Carborundum Company, Niagara Falls, New York.



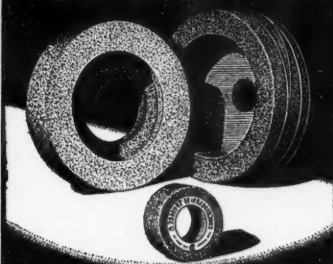
A Good Rule for Good Grinding



Specialized wheels by CARBORUNDUM
for thread grinding



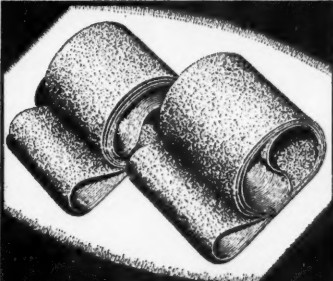
Cutting-off wheels... the modern tool
for faster, less costly, more finished cuts.



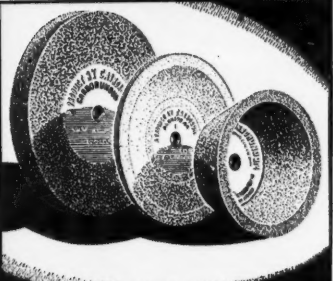
Cool-cutting green grit wheels for
cemented carbide



Diamond wheels to meet stiffer
technical needs



A coated abrasive for every
sanding and finishing condition.



All standard shapes are supplied in
grinding wheels by CARBORUNDUM

CALL IN

CARBORUNDUM

TRADE MARK

● BONDED ABRASIVES ● COATED ABRASIVES ● ABRASIVE GRAINS AND COMPOUNDS

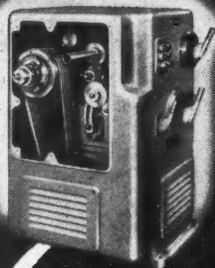
January, 1948

MODERN MACHINE SHOP 69

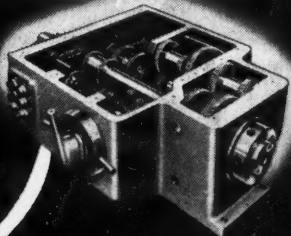
NOT JUST ANOTHER LATHE

but a Sidney Lathe!

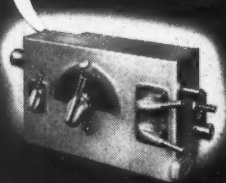
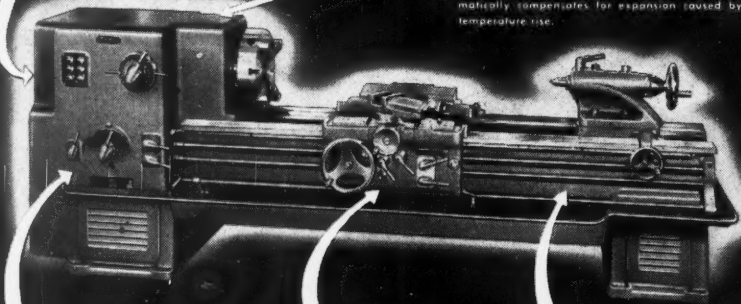
Check these features...



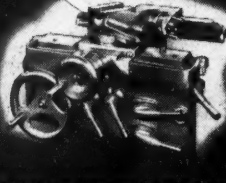
✓ Change gears rotate on anti-friction bearings and are mounted on fixed centers. Driving sheave is mounted on pre-loaded anti-friction bearings and is full floating on sleeve bolted to back of headstock. Drive shaft deflection is thus eliminated.



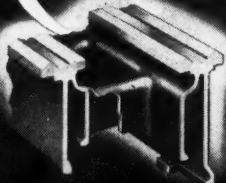
✓ All-herringbone geared headstock provides 32 pre-selective changes of spindle speeds through convenient dial control. Spindle and intermediate shafts are equipped with center bearings in addition to end bearings. Spindle mounting automatically compensates for expansion caused by temperature rise.



✓ Sidney's totally enclosed dial controlled gear box provides 60 changes of threads and feeds. All moving parts run constantly in oil.



✓ Controls are conveniently located for comfortable operation. Off-set compound—extra large micrometer dials—thumb screw dial lock. Notice also the four swivel hold-down bolts for added rigidity.



✓ Rigid four-wall bed construction with double cross girts spaced at 12 inch intervals. Casting is of semi-steel nickel mixture for close grain structure.

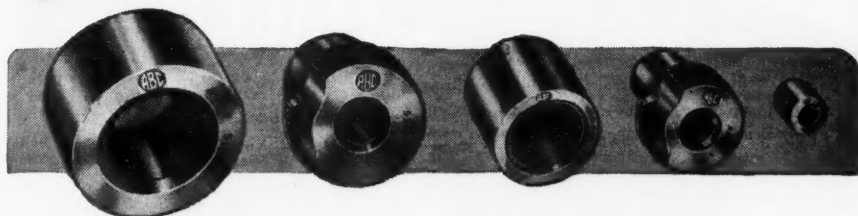
SIDNEY MACHINE TOOL COMPANY • SIDNEY, OHIO

Builders of Precision Machinery Since 1904

ABC Drill Jig Bushings

**A·S·A
STANDARD**

MEET HIGHEST STANDARDS OF
ACCURACY and CONCENTRICITY



- **PRECISION FINISHED** for accuracy and long life
- **HIGHEST QUALITY MATERIAL** obtainable for the purpose
- **EXPERTLY CHECKED** for dimensional correctness, concentricity and hardness
- **STOCKS MAINTAINED** — popular sizes and types at Dayton, Cleveland and Stratford; complete range of standard sizes and types at Garwood.
- **LINE INCLUDES A. S. A. STANDARD HEADLESS PRESS FIT BUSHINGS**
- **HEAD PRESS FIT BUSHINGS**
- **SLIP RENEWABLE BUSHINGS**
- **FIXED RENEWABLE BUSHINGS**
- **HEADLESS LINERS**
- **LOCATING JIGS, LOCKSCREWS**
- **CLAMPS**

Our latest catalog giving standard bushing sizes, together with price list and other information indispensable to the tool engineer, sent upon request.



REPRESENTATIVES

| | | |
|---|--|---|
| BOSTON, MASS. M. A. Siebert Co. Garfield 0104 | DETROIT, MICH. Die-maker Supplies Co. Trinity 1-2865 | NEW YORK, N. Y. Carlton Eberhard Wisconsin 7-9193 |
| *CLEVELAND, OHIO The Die Supply Company Express 1133 | INDIANAPOLIS, IND. General Supply & Tool Corp. Lincoln 8353 | PHILADELPHIA, PA. Albert R. Dorn DElaware 6-5553 |
| DAVENPORT, IOWA Davenport Engineering Corp. DAvenport 2-1791 | MILWAUKEE 3, WIS. The Stone Company, Inc. Broadway 2452 | ROCHESTER, N. Y. Pink Tool Co. Monroe 5679 |
| *DAYTON, OHIO Geo. D. Lougher Co. KENmore 4191 | MINNEAPOLIS 2, MINN. Chas. W. Stone Co. Geneva 8631 | *STRATFORD, CONN. Ellsworth Steel & Supply Co. BRidgeport 7-3317 |

* Stock of popular sizes carried at these locations.

REPRESENTATIVES IN OTHER IMPORTANT CITIES

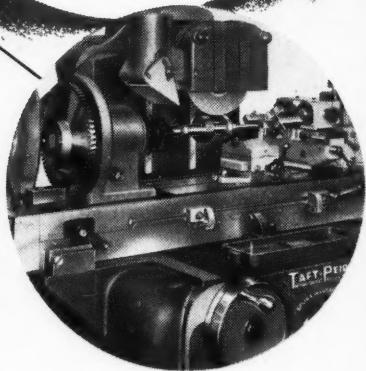
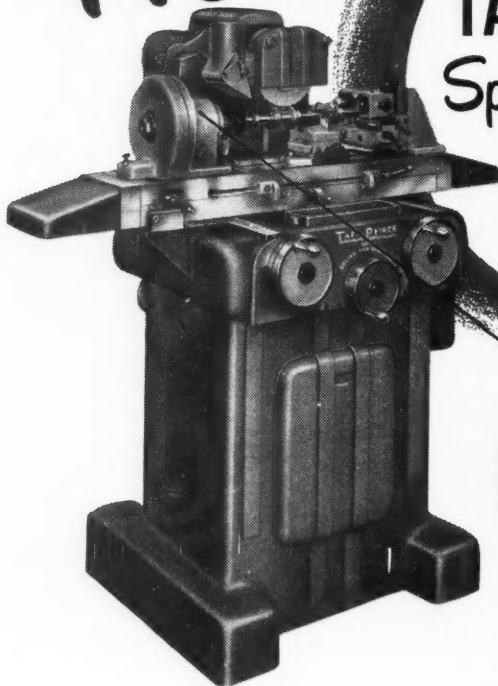
ACCURATE BUSHING COMPANY

437 North Ave., GARWOOD, N. J. • Westfield 2-2415



New

TAFT-PEIRCE Spline and Gear GRINDER



Above: Details of table, tailstock, and workhead construction with index plate (uncovered) at left.

TAFT-PEIRCE NOW ANNOUNCES a small semi-automatic grinder which produces fine-pitch gears and splines to extremely close tolerances. *Add up these features:*

RUGGED, COMPACT, EASY TO OPERATE. This machine has the same base, column, spindle-head, and bearings as the famed Taft-Peirce No. 1 Precision Surface Grinder.

AUTOMATIC INDEXING at the end of each stroke. Master plates assure precision spacing.

ADJUSTABILITY OF INDEX cams eliminates unnecessary traverse motion.

QUICK ARBOR-REMOVAL by lever-operated tail-stock.

WHEEL-DRESSING DURING WORK-CYCLE permitted by special 3-diamond wheel-dresser.

POSITIVE LOCKING of cross or longitudinal travel.

Write for Bulletin MM6 to The Taft-Peirce Mfg. Co., Woonsocket, R. I.

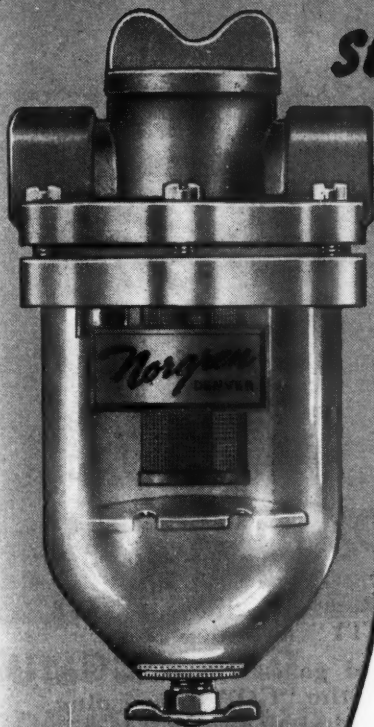


THE TAFT-PEIRCE MANUFACTURING CO.

WOONSOCKET, RHODE ISLAND

Stop Costly Shutdowns

Keep air power clean



Norgren Filters knock out all air-borne rust, dirt and pipe scale, and eliminate oil emulsion and moisture. Air driven tools and cylinders perform better, require less maintenance and last longer. Fine mesh double Monel wire screen stops all solids. Easy to clean . . . open waste cock, blow it out. Highest quality construction thruout. Range of sizes.

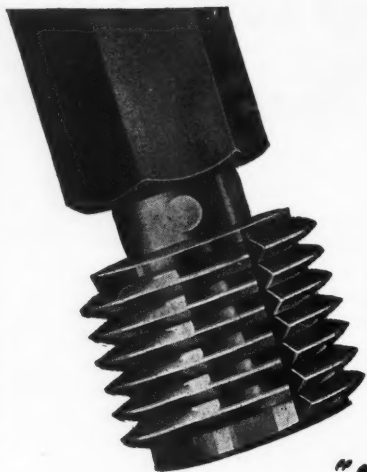
Transparent Bowl — you know it works; you see it work!

Write

C. A. NORGREN CO.
222 Santa Fe Drive
Denver 9, Colorado

Norgren

*There IS a
Difference In Gages!*



"Dirt Groove"

Even in so small a detail as a chip groove, "THAT UNSEEN EXTRA QUALITY" is evident.

Republic's working thread gages are made "to gage". The chip groove in the "GO" thread plug member has been specially designed so that it will clean the threads of the part while gaging, without cutting or changing the size or thread form of the tapped hole.

May we tell you more about Republic's service to makers of threaded parts?

RELY ON



REPUBLIC

REPUBLIC GAGE

DETROIT 21, MICHIGAN

New! Improved!

Available With Power or Hand Feed

SUNDSTRAND DRILLING AND CENTERING MACHINES

Fast, accurate drilling or centering on one or both ends of workpieces can be maintained consistently with the new Sundstrand 53-A Drilling and Centering machine. Girder type bed construction provides extra rigidity, insures accuracy. Spindle speeds are quickly and easily changed with vee belts and pulleys.

Illustration at top shows power operated vises. Other illustrates hand operated vises.

The 53-A Drilling and Centering machine is usually furnished with power or hand control but can also be furnished with a combination of power feed and hand operated vises or manual feed and power operated vises. With power vises operator can clamp long work near each end from one central push button station.

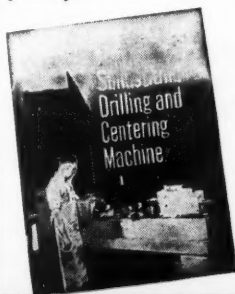
FREE DATA

This new bulletin contains complete specifications of this new, modern Sundstrand Drilling and Centering machine. Write for your copy today. Ask for bulletin No. 568.

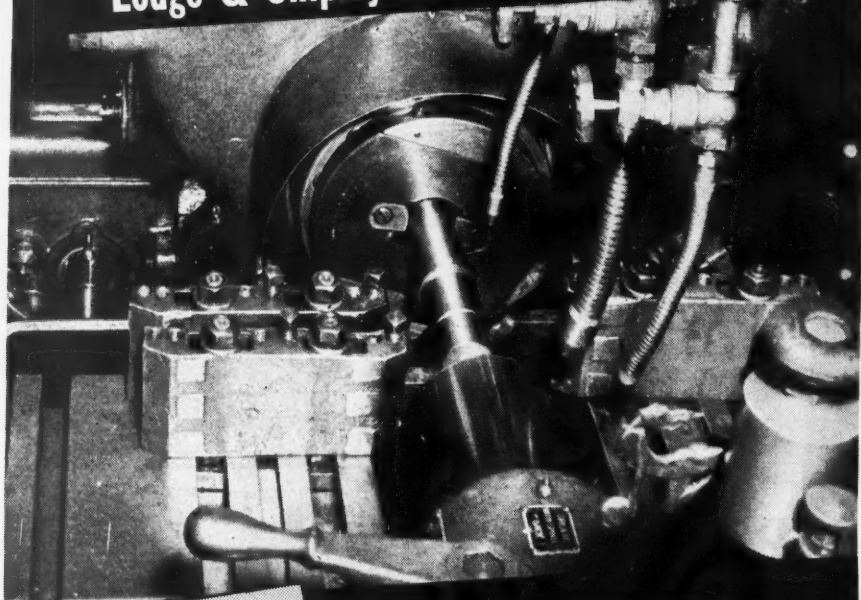


SUNDSTRAND MACHINE TOOL COMPANY

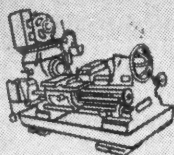
2539 Eleventh St. Rockford, Ill., U. S. A.



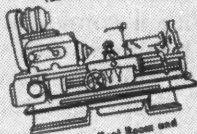
Lodge & Shipley Lathes *at work...*



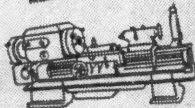
**OUTPUT... Greatly Increased
TIME SAVED ... 15 Minutes per part**



2A and 3A Duomatic
(automatic) Lathes



Engine, Tool Room and
Manufacturing Lathes



Hollow Spindle
Lathes

Adding another chapter to Lodge & Shipley's production record . . . here's proof in the owner's words: "Lodge & Shipley Lathes have done a very efficient job for us . . . maintenance is low in cost." And that's just part of the story of Lodge & Shipley Lathe performance at the Philadelphia plant of Link-Belt Company, producing speed reducers.

In the illustration, a 3-A Duomatic (automatic) Lathe is turning a shaft of heat-tempered steel with carbide tools. With a surface speed of 300 F.P.M. and .014 feed, (output increased and easier to hold accuracy) the time saved on each part is 15 minutes over former lathes used.

Send for condensed catalog describing Lodge & Shipley Lathes.

THE Lodge & Shipley
COMPANY

MACHINE TOOL DIVISION • 3055 COLERAIN
SPECIAL PRODUCTS DIVISION • 800 EVANS ST.
CINCINNATI 25, OHIO



Production gaging with
External Comparator No.
951 and Amplifier No. 950.

NEW! *Electronic*

• EXTERNAL • INTERNAL

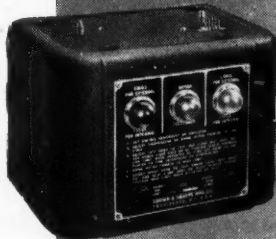
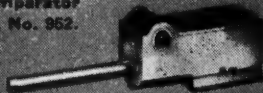
Precision gaging on a mass-production scale is now both practical and economical with the new Brown & Sharpe Electronic Measuring Equipment. By applying electronic-supersensitivity, accurate gaging to .00001" can be performed as fast as test pieces can be handled.

An outstanding advantage is the separate amplifier unit which isolates all important heat-producing elements . . . preventing temperature drift in gaging units. Another unique advantage . . . the true linear response of gaging units permits accurate setting for entire scale with only 1 gage block or master.

Investigate the many advantages of this time-saving, precision measuring equipment. Write Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

We urge buying through the Distributor

Internal Comparator
Attachment No. 952.



Signal Light At-
tachment No. 953

Gage Head Car-
tridge No. 953
for mounting in
jig or fixture.



BROWN & SHARPE



"Dalbo"

interchangeable

Couplings and Fittings



Hose
Ends



Pipe
Ends



Couplings



Fittings

DALLETT presents a line of fittings for compressed air lines that are built to "take it." They are interchangeable with similar types, quick-fitting, dependable, pressure-proof, and provide outstanding Dallett safety features. Every Dallett "Dalbo" fitting and coupling is subjected to rigid inspection. They are accepted as the quality standard wherever they have been used.

"Dalbo" couplings and fittings are expertly machined from solid bar stock. They are rust-proof and are completely tight under any pressure upward from 10 pounds. The "Dalbo" locking sleeve prevents accidental uncoupling.

"Dalbo" couplings and fittings, stocked in a number of styles and sizes are available for immediate shipment . . . "Dalbo" couplings are used for oil, gases, and many fluids as well as for air lines.

Write for Bulletin 300

- HOSE MENDERS • AIR HOSE
- BUSHINGS • CLAMPS • MANIFOLDS
- BLOW GUNS

TOOL MAKERS



SINCE 1883

THE DALLETT COMPANY

MASCHER AT LIPPINCOTT STREET, PHILADELPHIA 33, PA.
Manufacturers of Pneumatic Tools and Accessories

DISTRIBUTORS in principal cities throughout the
United States, Canada, Europe and South America.



JIG GRINDING

with the

Vulcanaire

WHEN jig grinding is needed you can have it quickly and economically with the VULCANAIRE. This precision attachment can be placed in the spindle of your jig borer (or other machine tools) and you can accurately locate and finish grind holes in hardened steel to "tenths" at controlled speeds ranging up to

65,000 RPM. The VULCANAIRE is a precision instrument that takes the high cost out of jig grinding.

♦ ♦ ♦

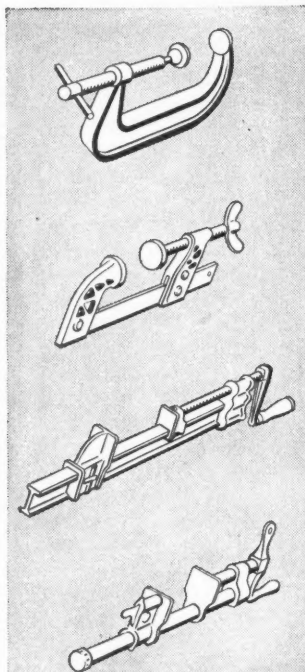
Write for detailed literature—or for a quotation, please advise the name and type of machine on which you would like to use the VULCANAIRE.

VULCAN TOOL COMPANY • DAYTON 10 • OHIO

H
HARGRAVE
Individually Tested Clamps

More Patterns...

More Sizes!!



ABILITY to keep pace with industry's changing needs has been the basis of Hargrave's leadership in the production of mechanic's hand tools since 1879. Skilled mechanics know that for every clamping need there's a Hargrave size from 1 in. to 10 ft. openings in 25 popular patterns.

WRITE FOR CATALOG showing the complete line of Hargrave Clamps — $\frac{3}{4}$ in. to 10 ft. openings, from $\frac{1}{2}$ in. to 16 in. deep; also Chisels, Punches, File Cleaners, Washer Cutters, Brace Wrenches, etc.

There Is a Nearby Industrial Distributor

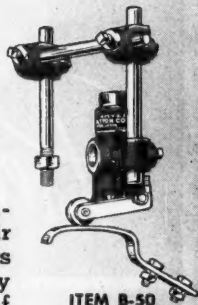
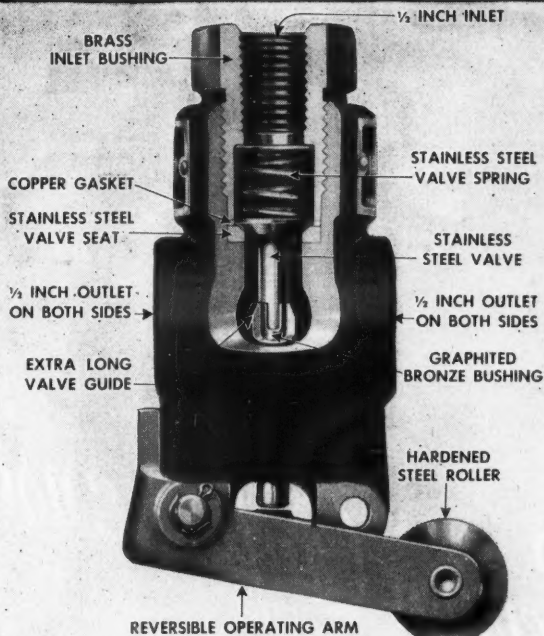
H
HARGRAVE

1947 Waverly Ave.
Cincinnati 12, Ohio

The Cincinnati Tool Co.

INCREASE MACHINE TOOL EFFICIENCY with

Palmer Shile **AIR SAVER** *Leak Proof* **AIR VALVE**



ITEM B-50
Complete Assembly
includes Valve,
Mounting Rods,
Operating Cam.

\$12⁵⁰

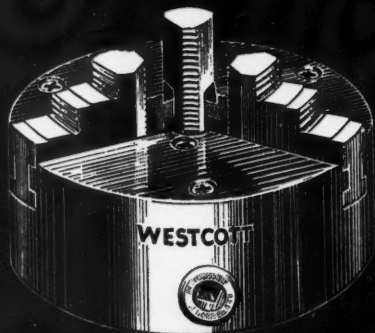
A real precision-built, leak-proof air valve that completely harnesses air power and assures split-second air control at all times. The easy-to-install Air Saver mounts in any position—operates at any angle—unaffected by vibration—provides ample air volume for operation of single or multiple jets. A natural where air is used for cleaning, drying, cooling, positioning or ejecting. Especially recommended around punch presses, die casting machinery, drill presses—and in reaming, broaching and other operations. *Immediate Delivery.*

Item B-100 (Valve Alone) \$10.00

Palmer Shile Co.

16022 FULLERTON AVE. • DETROIT 27, MICH.

WESTCOTT



Precision Craftsmanship

WESTCOTT CHUCK COMPANY
100 EAST WALNUT STREET
CHICAGO 14, NEW YORK

PRECISION • DEPENDABILITY • SERVICE



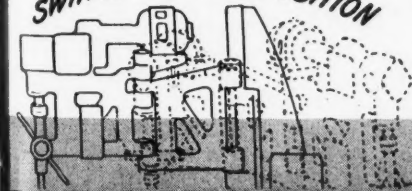
Quick acting electrical reverse for tapping.

6 quick speed changes.

Direct connected two speed motor.

Power elevating spindle height adjustment.

SWINGS TO ANY POSITION



FOOTBURT-HAMMOND

A VERSATILE DRILLING AND TAPPING MACHINE

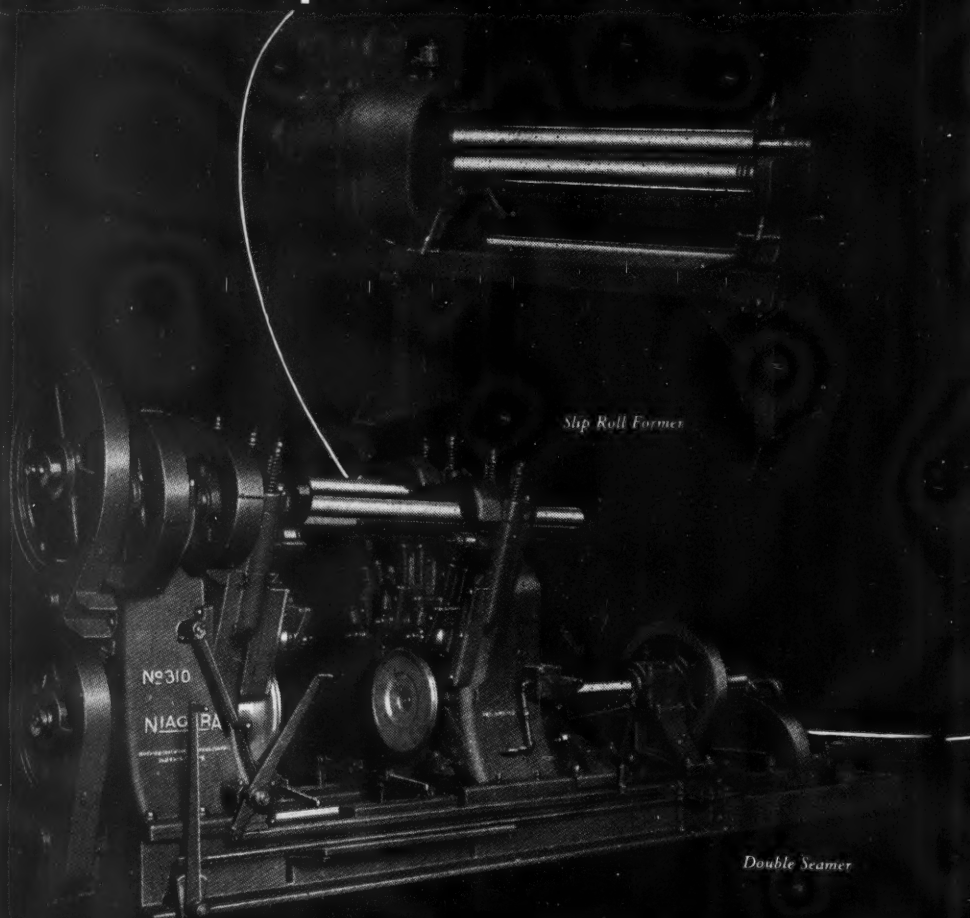
Hammond Radial Drilling and Tapping Machines may be spotted in the production line for drilling, tapping or reaming. With its unique bracket type construction the spindle can be swung quickly from hole to hole. Six quick speed changes are instantly available and the Hammond tapping reverse is very fast and convenient to operate.

THE FOOTE-BURT COMPANY • Cleveland 8, Ohio
Detroit Office: General Motors Building

Radial
DRILLING MACHINES

NIAGARA

PRESSES, SHEARS, MACHINES
and tools for plate and sheet metal work



Double Scamer

NIAGARA MACHINE & TOOL WORKS, BUFFALO 11, NEW YORK D



*Combination machine
for burring, turning,
wiring, beading, crimp-
ing, slitting and circle
cutting.*

• The complete line of Niagara machines for sheet metal working provides equipment for production, maintenance and job work in large plants and small shops. They assure well coordinated setups for shearing, blanking, forming, seaming, flanging and many other essential operations. Write telling us your requirements and we will send you Bulletins on machines and tools for your work.

Circle Shear and Flanger



SAVE 3 WAYS

ON SMALL PARTS MILLING

YOU have them every day — small parts milling jobs that take a chunk out of profits when handled on unnecessarily large machines. Most of them are jobs that can be turned out faster and more efficiently on an Atlas miller.

With the rugged, compact Atlas you save substantially: (1) on initial equipment cost; (2) in set-up time; (3) on power costs.

Any part that comes within the

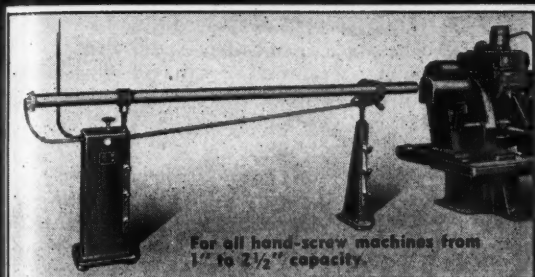
Atlas 4½" x 18" table — travelling 10" longitudinally and 3½" cross table — can be easily and quickly milled to close tolerances. There are 8 spindle speeds from 62 to 2870 RPM . . . choice of manual, lever or Change-O-Matic controls . . . Timken-bearing smoothness. With air chuck and control devices added, you have a semi-automatic machine with remarkable production abilities. Send for catalog with complete specifications today.

ATLAS PRESS COMPANY
146 N. PITCHER ST. • KALAMAZOO 13, MICH.

Atlas **MILLING
MACHINE**



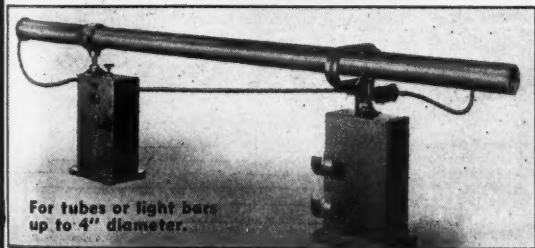
THROW AWAY YOUR FEED FINGERS



For all hand-screw machines from
1" to 2 1/2" capacity



For small hand-screw machines and
for Brown-Sharpe Auto



For tubes or light bars
up to 4" diameter.

No More Grabbing
of the Piece with

LIPE

PNEUMATIC BAR FEEDS

Lipe Bar Feeds completely eliminate feed-fingers and feed finger mechanisms. Your piece is not grabbed but automatically pushed by an air driven piston. Eliminates marring, scratching or deforming. Will not feed short.

*For all types of single
spindle screw machines*

The Lipe Bar Feed method for hand-operated or automatic screw machines regardless of size, is fast, safe . . . substantially increases production. And what's more, improves the quality of your output.

*In one feed-out, you can
feed any desired length
up to full length of stock
. . . on Lipe Pneumatic Bar
Feeds.*

INCREASE YOUR OUTPUT!

Write or call us today for complete descriptions and engineering data on Lipe Pneumatic Bar Feeds. No charge or obligation for this service.



PROTECTED BY PATENT

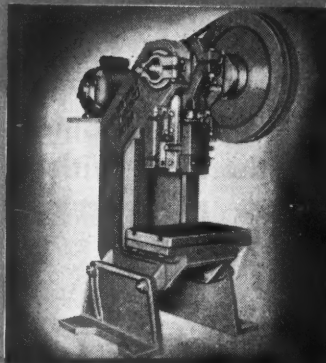
Lipe-ROLLWAY CORPORATION, Syracuse 1, N. Y., U.S.A.

Cable Address: LIPEGAR

Rousselle

PUNCH PRESSES

5 & 10 TON CAPACITY
BENCH PRESSES

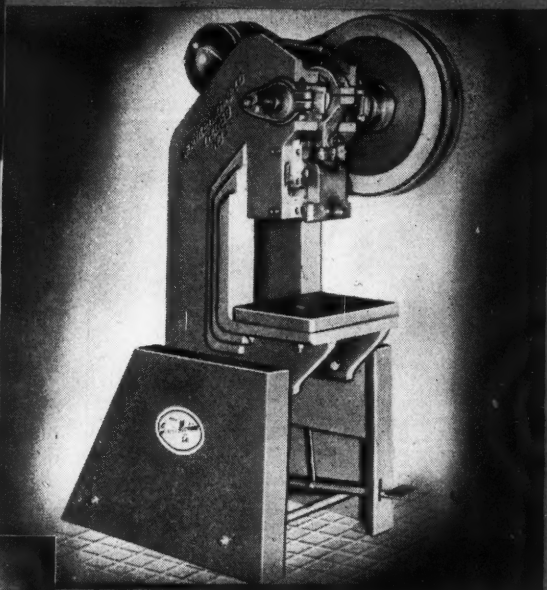


These new A series Presses have been developed due to the demand for a better and ordinary Bench Press, and retain all the sturdy characteristics of their predecessors with added safety, speed, strength, and ease of operation and maintenance.

These Presses were designed to provide strength, accuracy, speed and endurance.

These models will handle any requirements within their capacities for stamping, blanking, forming and any other high speed operations.

5, 10, 15, &
25 TON O.B.I.
FLOOR MODELS



15 TON
HORN PRESS

This Press is performing a wider variety of jobs which until recently were not thought of as Press operations.

The predominant feature is the adjustable bed which can be raised or lowered to the required die space.

The bed can be easily removed for the use of horning dies.



FOR FURTHER DETAILS —
SEE YOUR DEALER OR WRITE US

SERVICE MACHINE CO.

7633 S. ASHLAND AVE., CHICAGO, ILL.

Busy days ahead!



IT MAY be that long service or careless handling has worn many of your most-used gage blocks until they're 'way out of tolerance. It pays to know which blocks need reconditioning or replacement. Send your whole set of blocks in to Ford for inspection. Cost is only 25 cents a block for "A" and "B" blocks up to one inch, or for each inch of length of longer blocks. (Minimum charge \$1.) Details, methods, costs, of reconditioning your gage blocks, including the Ford chrome-plating method, sent on request. Write—

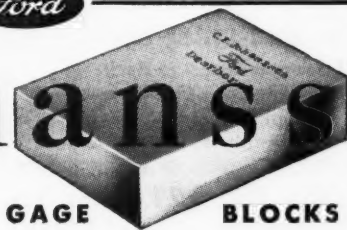
**ITEMIZED
CERTIFICATE OF INSPECTION**

Shows you which blocks, if any, are inaccurate and the extent of inaccuracy. Issued with each inspection.

FORD MOTOR COMPANY • JOHANSSON DIVISION
3607 Schaefer Road, Dearborn, Mich.



Johansson



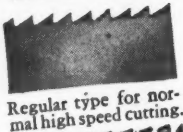
GAGE

BLOCKS

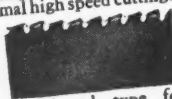
DISSTON METAL CUTTING BAND SAWS

In Types, Patterns, Tempers
for All Metals, All Speeds

HARDENED THROUGHOUT



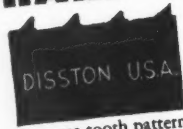
Regular type for normal high speed cutting.



Reinforced type for heavy-duty, high speed cutting.

For high speed cutting of non-ferrous metals, plastics and many other materials. Made with Regular and Reinforced teeth in all standard dimensions. Also recommended for friction cutting of ferrous metals at speeds of not less than 12,000 f.p.m.

HARD EDGE, FLEXIBLE BACK



Buttress tooth pattern for speeds of 3,000 f.p.m. and over.



Regular type for normal low speed cutting.

Hardened on tooth edge only. Teeth are milled (not punched) and accurately set by machine. Made with Regular type teeth for general metal cutting at low speeds; and with Buttress type teeth for machines operating at speeds of 3,000 or more f.p.m. . . . specially recommended for magnesium and aluminum alloys.

NEW! DISSTON Safety Reel



An improved design with added features. Supplied with all sizes of Hard Edge Flexible Back blades from 1/4" to 1/2" in coils of 100 feet.

For Better Metal-Cutting Tools Ask for Disston Files . . . Hack

Saw Blades . . . Circular Saws . . . Carbology
Fitted Circular Saws . . . Tool Bits.
Order from your DISSTON Distributor or write
direct for further particulars.



ESTABLISHED 1840
REG. U.S. PAT. OFF.

HENRY DISSTON & SONS, INC., 121 Tacony, Philadelphia 35, Pa., U. S. A.

In Canada, write: 2-20 Fraser Ave., Toronto 1, Ont.

No Other Tapping Head Offers So Many Tapping Advantages!

NEW PROCUNIER HIGH SPEED COVER CLAMPING TAPPING HEAD

is way out ahead with new features which mean *faster tapping—less tap breakage*. It clamps directly to drill press quill, providing a completely rigid mounting, free from chatter and vibration. New sensitive double-cone friction clutch engages the surfaces of the drive and reverse shells with a soft "cushioned action." Operators quickly detect dull or "loaded" taps just by the pressure needed to drive the tap. The heat treated gear reversing mechanism; the ball bearings for accuracy and long life; the simple "one-shot" lubrication; the new lighter, smaller and more accurate "Tru-Grip" Tap Holder—all these features and many more mean new economy, new accuracy with this High Speed Procunier Tapping Head.

A complete line of Procunier High Speed Tapping Heads is available, including heads to fit most makes and sizes of drill presses.

Write today for illustrated
bulletins giving complete
specifications and prices.

Procunier

Safety Chuck Company

12 S. Clinton St.

Chicago 6, Ill.



Prompt
Delivery

NEW "TRU-GRIP" TAP HOLDER

Lighter, more accurate, this tap holder drives the tap by the square of the shank—holds it in alignment by the round—tap shanks are never "chewed up."

PROCUNIER SAFETY CHUCK CO.

12 S. Clinton St., Chicago 6, Ill.

Send me bulletins on

- ☐ Procunier High Speed Tapping Heads
- ☐ Procunier "Tru-Grip" Tap Holders
- ☐ Universal Tapping Machines

Name _____

Address _____

City _____ State _____

THE ANSWER TO

Accuracy



- ★ GAGES
- ★ END MILLS
- ★ MILLING CUTTERS
- ★ FORM RELIEVED CUTTERS
- ★ SPECIAL TOOLS
- ★ REAMERS
- ★ COUNTERBORES



FALCON TOOL CO.
DETROIT, MICHIGAN

**WIRE FOR DETAILS AND DELIVERY DATA—
WE'LL GIVE YOU QUICK ACTION!**

PROSSER

Carbide Grinders



MODEL
AA



For fast, efficient rough grinding and fine finishing of carbides, stellite, high speed steel, and other modern tools, install Prosser Carbide Grinders. Their rugged construction, modern design, and ease of operation insure long, dependable and profitable service.

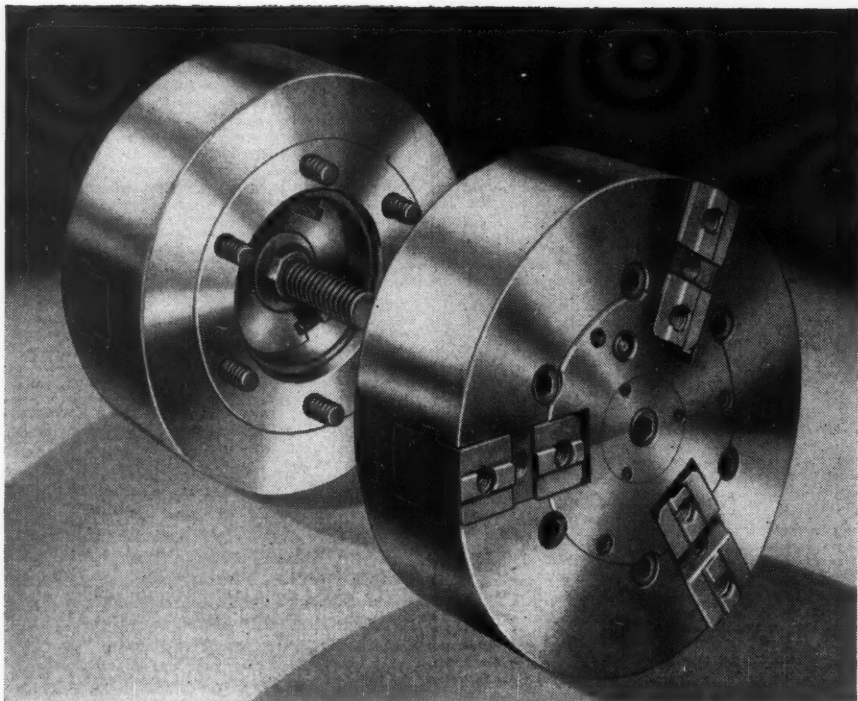
Prosser Carbide Grinders are built in bench and floor models of several capacities, for wet or dry grinding. Attachments for chip breaker and drill grinding.

Important features include:

- Quick-acting indexing tables.
- Adequate wet-grinding equipment.
- High grade ball bearing spindles.
- Oversize wheels, giving longer wheel life, and permitting grinding of larger tools.
- Moderate price.
- Prompt deliveries.

Write for details

Thomas Prosser & Son
120 WALL STREET • NEW YORK 5, N. Y.



FRONT & REAR VIEW SERIES 1300

Blue Chip Investment...

With a Skinner Power Chuck, work can be chucked so fast and so easily that production increases while operator fatigue is reduced. And because they are functionally designed and accurately constructed, production is more precise as well. Skinner Power Chucks are "Blue Chip" investments — bound to return good dividends for years and years.

These modern labor-saving devices have only four moving parts — a wedge and three jaws. This simplicity of construction results in several outstanding features. Initial accuracy of a high degree is more easily achieved and, with so few moving parts, it is maintained for a much longer time. A forged steel body of ample proportions to

withstand strains far greater than will ever be met, yet machined so accurately as to be in perfect balance, permits the use of higher cutting speeds for the efficient use of carbide cutting tools.

In addition, a special wedge angle design gives greater gripping power and offers a wider margin of safety. *Once a Skinner Chuck grips the work it will not release, even if the air is completely cut off, until the operator is ready to remove the piece.* (See this remarkable demonstration at the Skinner Exhibit in Booth 638 at the Machine Tool Show!)

Power chucking with a Skinner Chuck is a time-saving method that offers "Blue Chip" attractions to any manufacturer who invests in

machine tools today. Full details on this accurate, long-lived, cost-cutting equipment are contained in the Skinner Catalog No. 59. Write for it today.

The Skinner Chuck Co.

340 CHURCH STREET, NEW BRITAIN, CONN.

*Skinner
Chucks*



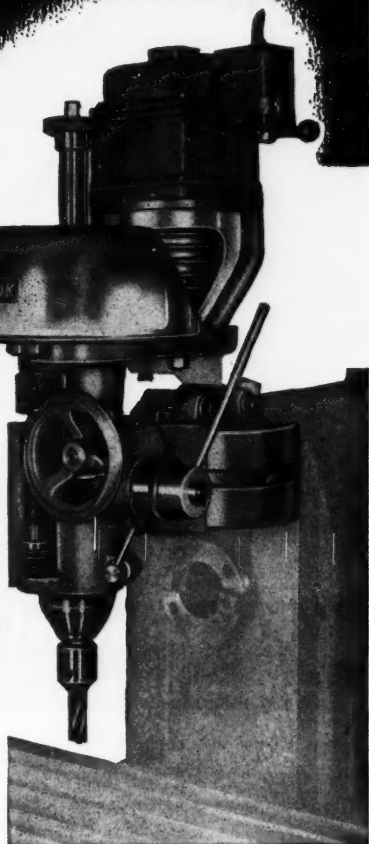
HAND & POWER OPERATED MACHINE CHUCKS — AIR CHUCK EQUIPMENT — FACE PLATE JAWS — MACHINE VISES

MEMO

Tom— I think the
RUSNOK has every
feature we need
for our milling
requirements.
Let's write for
their free illustrated
circular. J.D.P.

- Precision built for the heavier duty operations
- Heavy duty—easily handles maximum capacity— $1/16"$ — $3/4"$ end mills
- Six speeds—six splined pulley drive—timken tapered roller bearings
- Brackets to fit most milling machines—adaptable to many other types of machines
- Utilizes an unlimited variety of cutters
- For vertical, horizontal and angular operations
- 4" quill travel—#9 B & S spindle taper

Write for illustrated circular



prompt delivery

HEAVY DUTY

RUSNOK

ATTACHMENT

MILLING • DRILLING • BORING

RUSNOK TOOL WORKS • 4840 W. NORTH AVENUE • CHICAGO 39, ILL.

January, 1948

MODERN MACHINE SHOP 95

RAPID WORK ... QUICK CHANGE

with Continental Counterbores ...

You can reduce your tool cost, improve accuracy, and increase production with the Continental complete line of standard interchangeable cutting tools. Cutters have a balanced, indestructible drive—originated by Continental—that will not stick, will not break, and is hand detachable.

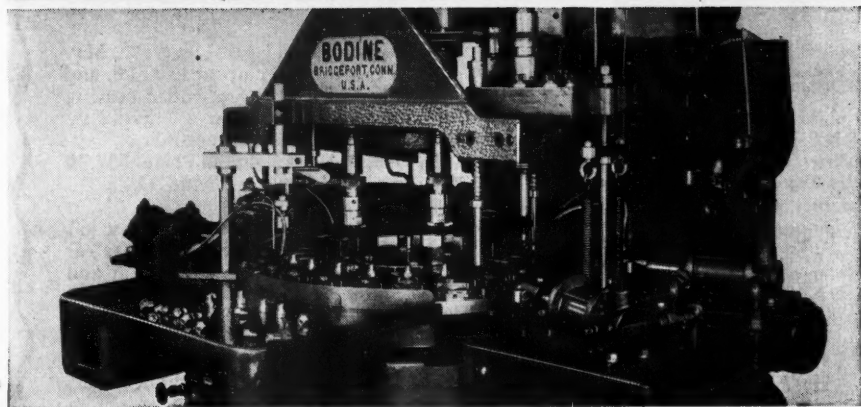
CONTINENTAL TOOL WORKS

Division of Ex-Cell-O Corporation
DETROIT 6, MICHIGAN



A Round Table Discussion

ON SMALL PARTS PRODUCTION.....

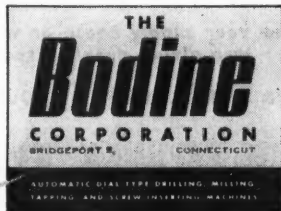


he low cost production of small metal parts . . . that require operations, such as Drilling, Milling, Tapping and Screw Inserting . . . has been solved by many leading plants, with Bodine machines.

Bodine basic design employs multiple spindles, each performing its operation at a given station on work positioned by an automatic indexing horizontal dial. There are 6 standard size machines which may be tooled for a multiplicity of operations.

Bodine engineers invite your inquiries for solution of specific problems . . . no matter how difficult. When you consider that spindles may operate vertically, horizontally, at any angle or from inverted position, it is evident that production possibilities are almost unlimited . . . within range of the smallest commercial tools up to 1/2" taps and drills. Spindle speeds rate to 20,000 r.p.m.

Check your present production of small parts . . . ask us for recommendations to increase speeds, lower costs.

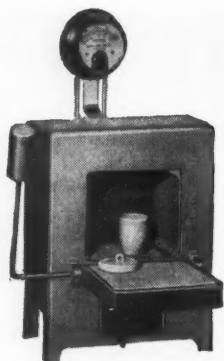


Interesting Bulletin

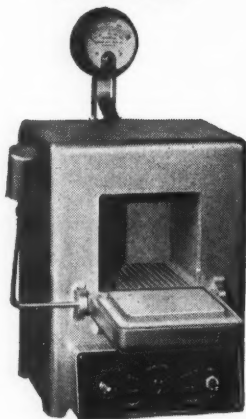
Send for illustrated bulletin showing actual jobs, specifications, Bodine principle . . . and how Bodines are adapted to your needs

WRITE FOR

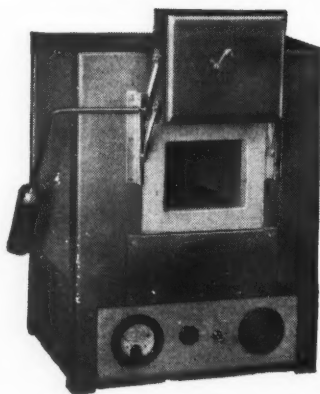
1BD48



MODEL GTP



MODEL CEA



MODEL OFE

TEMCO

ELECTRIC FURNACES

With the new TEMCO stepless control you can select and hold any desired temperature.

Model GTP—interior 4" x 3 $\frac{3}{4}$ " x 3 $\frac{3}{4}$ ". May be operated continuously up to 1500° F. and intermittently to 1850° F. Embedded heating element. Power consumption 1.2 kw. Cast aluminum body. Weight 15 pounds.

For 115V A.C. Price **\$57.50**
Also available for 230V and D.C.

Model CEA—interior 4 $\frac{3}{4}$ " x 4 $\frac{1}{4}$ " x 6". Maximum continuous temperature 2000° F. Element is embedded for its protection and surrounds muffle chamber for uniform heating. Power consumption 1.5 kw. maximum. Insulated aluminum body. Weight 31 pounds.

For 115V A.C. Price **\$80.00**
Also available for 230V and D.C.

Model OFE—interior 6" x 5" x 10". Maximum temperature 1600° F. continuous, 1900° F. intermittent. Synchronous motor driven control. Heating element covers four sides of chamber. Steel frame with 4 $\frac{1}{2}$ " insulation. Maximum power consumption 2.2 kw. Weight 130 pounds.

For 115 or 230V A.C. Price **\$194.00**

TEMCO furnaces have low initial cost and are economical to operate as nearly all the power is consumed within the heating chamber. They are fast heating and ideal for general laboratory uses, heat-treating and small unit production.

See your supply house or write for literature giving detailed specifications

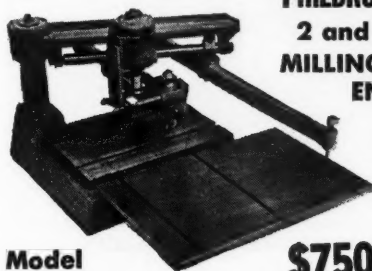
488 WEST LOCUST ST., DUBUQUE, IOWA

**THERMO ELECTRIC
MANUFACTURING COMPANY**

Fast, Efficient, Economical Production of . . .

IF you're looking for fast, accurate production of these machining operations, it will pay you to investigate AUTO ENGRAVER equipment. Precision made in all respects . . . they'll do a real job.

PHILBRO "CONTROL-CUT" 2 and 3 Dimensional MILLING • PROFILING ENGRAVING



**Model
CC-3D**

\$750

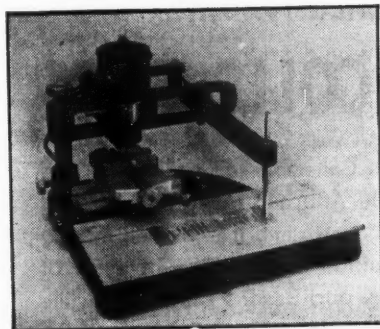
F.O.B., N.Y.

SIMPLE TO OPERATE

- **MILLING**
- **BORING**
- **DRILLING**
- **PROFILING**
- **ENGRAVING**
- **ROUTING**

and similar precision
machining operations

A 2 and 3-dimensional cutting, milling or engraving machine designed to reproduce any required shape, line or contour from an enlarged master template. The "Control-Cut" now makes production of Blanking Dies, Templates, Molds, Milling irregular slots, contours, parts of machines, or instruments, or any 2 or 3-dimensional metal removal operation simple, fast and inexpensive. Fully ball bearinged, 3 spindle speeds, variable ratio pantograph from 2:1 to 4:1 and intermediate ratios.



Portable PANTOGRAPH ENGRAVER

Model CC-2A A precision industrial engraver that does not require skilled operators. Designed for rapid, accurate engraving of letters, designs, small panels, name plates and parts, and experimental work in the lab. Pantograph arms permit easy control of machine; adjustable control determines depth of cut. Engraves brass, steel, aluminum, ivory, wood and all types of plastics. . . . **\$300**

ALL PRICES F.O.B. N. Y.

Pantograph Controlled ENGRAVER

Model PE-1. Widely used for rapid commercial and industrial production engraving of all machinable metals, wood, plastics, ivory, etc. • Built of the finest material and precision made in all details. • Does not require skilled operator. • Easily regulates depth of cuts. • Engraves area 5 x 5 and larger by resetting work and on curved surfaces without special templates. **\$350**

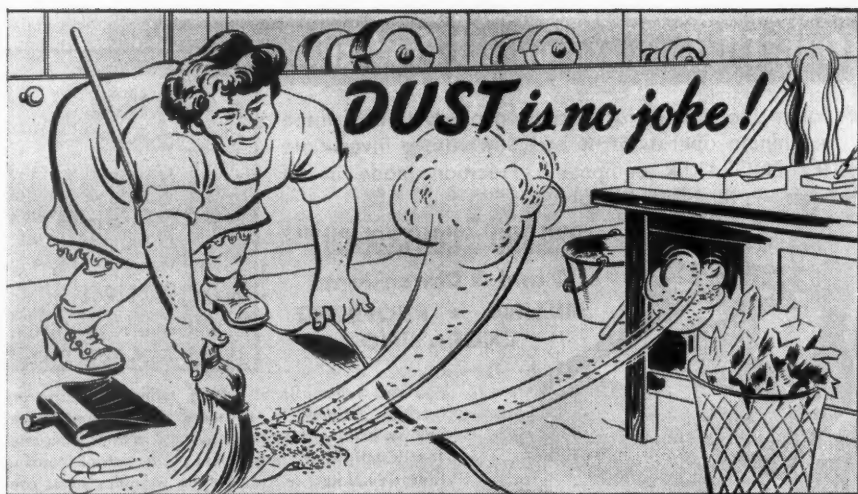


**Model
PE-1**

AUTO ENGRAVER COMPANY, Inc.

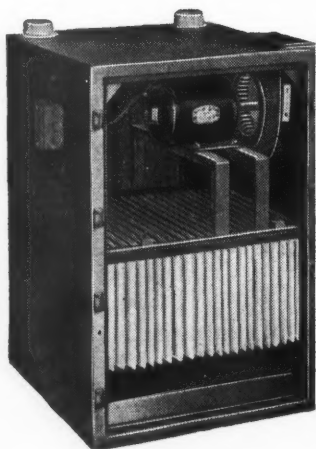
1776 BROADWAY

NEW YORK 19, N. Y.



Trap abrasive dusts, and dispose of them,
easily and economically, with

TORIT DUST COLLECTORS



TORIT Dust Collectors are self-contained and portable. Attached at the machine, dust laden air is drawn into the cabinet, moving from the outside to the inside of a set of filters. Heavy particles fall into a tray, while the finer dust adheres to the outside of the filters. A few strokes of the shaking lever cleans the filter.

TORIT Dust Collectors, ranging in size from $\frac{1}{3}$ HP to 3 HP, are available for quick delivery. For complete information and the latest Torit catalog write:

TORIT MANUFACTURING CO.
296 Walnut Street St. Paul 2, Minn.

Another KENNAMETAL
Development...

ONE KENNAMETAL Grade

Will do your Cast Iron Jobs

One versatile Kennametal grade—K6—has all the characteristics required for practically every cast iron machining job. It performs equally well on roughing, finishing, or precision boring.

*K6 has the strength to withstand the shock of machining tough, sandy, or chilled castings, even when they are out of round, or have surface interruptions.

*K6 has high hardness to resist abrasion, and to hold its edge for long periods of cutting.

These properties are uniformly maintained by distinctive manufacturing processes.

Extracts from typical performance reports:

*"K6 removes metal from chilled cast iron piston trunks at tool cost of 74c per ton."

*"40 webbed flanges turned between grinds with K6, whereas one to four pieces was best performance of carbide previously used."

*"K6 turns out 11½ times as many pieces between grinds."

*"With K6 we have tripled the feed, doubled the cutting speed, and are facing 8 times as many sandy iron castings."

The best way to prove that K6 can reduce your tooling costs, and increase your production is to try it in your shop—then compare tool performance and overall costs. Ask your nearest field engineer to advise you.



KENNAMETAL

SUPERIOR CEMENTED CARBIDES

KENNAMETAL Inc., LATROBE, PA.

THERE'S A
KENNAMETAL
TOOL
with a K6 TIP
FOR EVERY CAST IRON
CUTTING JOB

SMALL
HIGH RPM

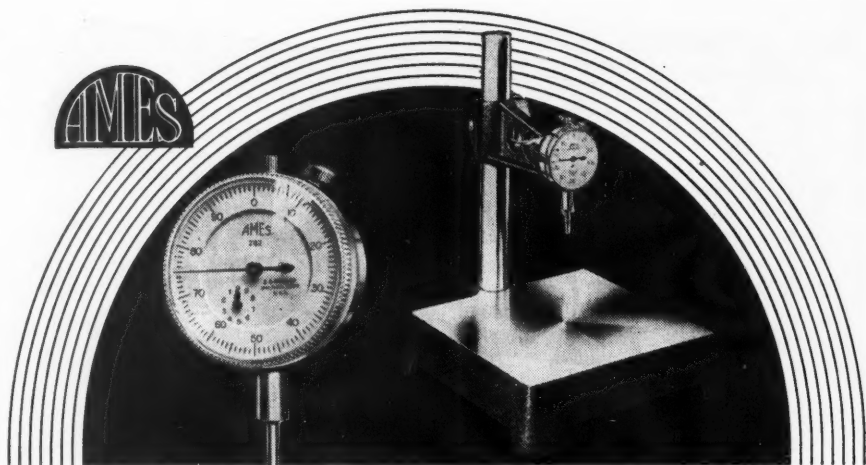
↑
STRONG, HARD

K6
SAVES TIME
AND TOOLING COSTS
ON BOTH JOBS
↓

LARGE
LOW RPM

STRONG, HARD

K6
EXCELS ON
INTERRUPTED
CUTS

The AMES logo is a stylized, arched emblem with the word "AMES" in a bold, sans-serif font.

DIAL COMPARATOR No. 13
LONG RANGE INDICATOR No. 282

DECIMALS AND DOLLARS

When you want to measure those decimals with maximum dollar savings, do it with an AMES DIAL COMPARATOR such as Model No. 13 shown above. Quickly and easily set to the required dimension. Maintains its setting even with rough usage. Gives instant, *accurate* readings — independent of the human factor. You'll find no other Comparator gives you such high production while saving so much in time and labor.

The 8"-square cast-iron base may be fitted with V-blocks, anvils, or stops of various kinds. The indicator-holding bracket extends 4" over the base and is easily adjustable on the 9" column. Measuring capacity is 6". Net weight 16 lbs.

The indicator shown is one of a complete line of AMES Long Range Indicators from which you may select exactly the graduations, range, and dial reading best suited to your needs.

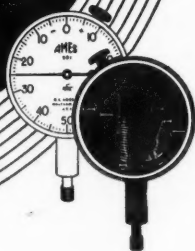
For information on our full line of Comparators and many other measuring instruments, address our Home Office:

29 Ames Street, Waltham 54, Mass.

B. C. AMES CO.

Mfr. of Micrometer Dial Gauges
Micrometer Dial Indicators

Representatives in
principal cities

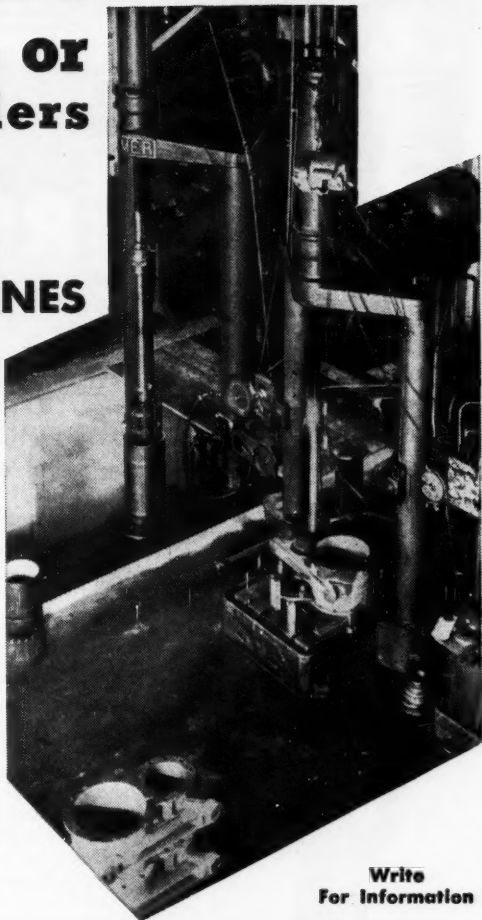


PRECISION HONING **Of DIESEL or** **Other Cylinders** **FULMER** **HONING MACHINES**

Liners can be honed direct from the worn bore to the next oversize in a matter of minutes. No preliminary boring is required. The honing operation removes taper and out-of-roundness of the worn bore. The honed bore will be round and straight.

Finishing of all classes of cylinders can be done in a few minutes—many times faster than possible by any other method. Precision and correct surface finish are obtained *automatically*.

The economical and precise way to finish diesel, air pump, stoker, brake and other cylindrical bores is by honing. Let us tell you how much we can save you in labor and improve your quality.



Write
For Information

C. ALLEN FULMER COMPANY
1233 First National Bank Bldg., Cincinnati, Ohio

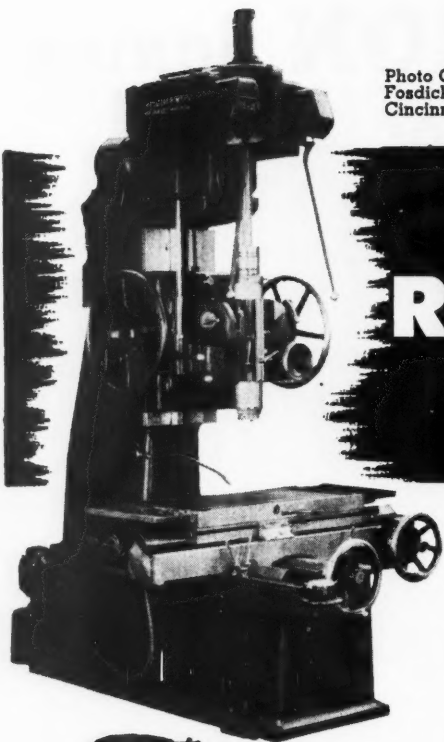
FULMER
PRECISION PRODUCTION EQUIPMENT

ROD BORERS
HONING MACHINES
PISTON RING LAPPERS
CENTRIFUGAL CASTING MACHINES

DEALERS: A few attractive territories remain open. Write today!

Photo Courtesy:
Fosdick Machine Tool Co.
Cincinnati, Ohio

A RUTHMAN PUMP



✓
to speed production
✓
cut maintenance costs
✓
give long service

Instantaneous coolant flow, split-second control from a trickle to full volume, speeds production in your metal-cutting operations. Pre-lubricated oversized bearings, one-piece dynamically balanced shaft, no metal-to-metal contact reduces wear and assures long trouble-free service for Ruthman Gusher Coolant Pumps.

Designed on centrifugal principles, Ruthman Pumps fit a wide variety of circulating pump problems.

Illustrated is a Fosdick No. 30 Jig Borer equipped with a $\frac{1}{4}$ Model UL-7120 Ruthman Gusher Coolant Pump.

Ask for Catalog 10-F

THE RUTHMAN MACHINERY CO.



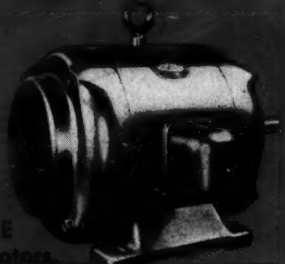
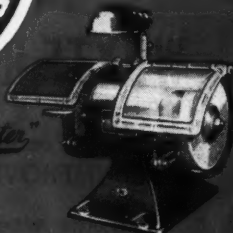
1816 READING ROAD

CINCINNATI 2, OHIO

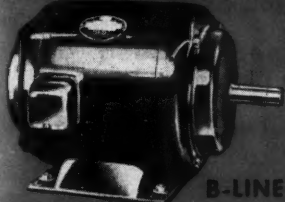


MOTORS & GRINDERS

Toolmaster
BENCH GRINDERS

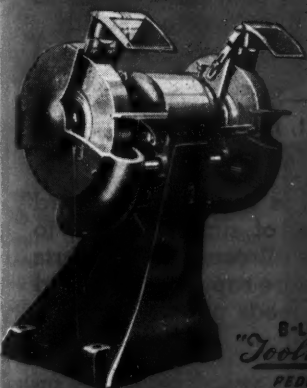


B-LINE Motors

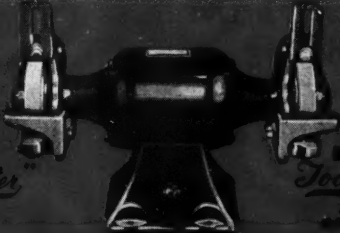


B-LINE Motor

FOR LASTING MOTOR SATISFACTION TRY B-LINE—THE STANDARD OF QUALITY SINCE 1925. Standard motors from 1/6 to 30 H.P., also Condenser and Gear Head Motors, and motors for special applications.—Remember there's a B-Line Motor for every job.



B-LINE "TOOLMASTER" GRINDERS—A complete line of Bench and Pedestal Type from 1/4 to 5 H.P. ratings—Every B-Line product is GUARANTEED and backed by Coast-to-Coast Service.



B-LINE
Toolmaster
PEDESTAL GRINDERS

B-LINE
Toolmaster
BENCH GRINDERS

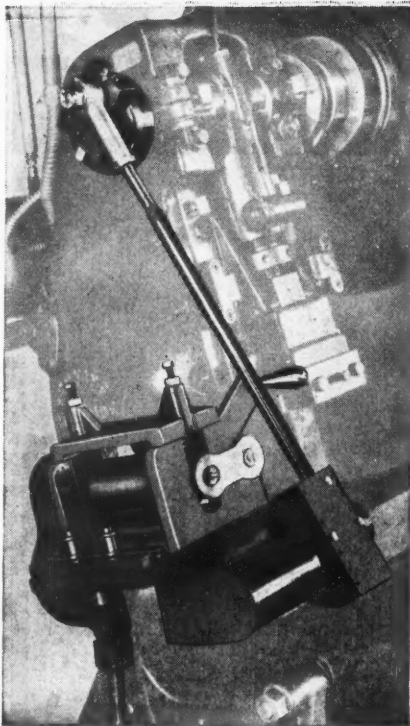
WRITE FOR
GRINDER BULLETIN
No. 7000
MOTOR BULLETIN
No. 5000

THE BROWN-BROCKMEYER COMPANY

PLANTS AT DAYTON, WILMINGTON, WASHINGTON AND KENIA, OHIO

GENERAL OFFICES, DAYTON 1, OHIO

District Offices in Principal Cities



**IT'S HERE
IT'S NEW
IT'S ACCURATE
WHYTE ROLL FEED**

No other Feed gives you all of these **IMPROVED FEATURES:**

1. Carbide wear blocks for accurate roll clutch feed.
2. Hardened, ground and chrome plated feed rolls.
3. Simple two post mounting quickly adjustable to die height.
4. Capacity—Standard:
0 to $\frac{1}{4}$ inch stock thickness
0 to 6 inches stock width
0 to 16 inches length of feed
5. Types—Single, Dual, Left to right, Right to left, Front to back, Back to front.

This feed is well built for hard daily use, of simple design to eliminate all complicated parts and to insure rapid, smooth, and accurate feeds under all conditions.

SPECIAL FEEDS ON REQUEST.

**PROMPT DELIVERY,
MODERATE PRICES.**

WRITE TODAY FOR FACTS.

WHYTE ENGINEERING COMPANY

33 LYMAN STREET

SPRINGFIELD, MASS.

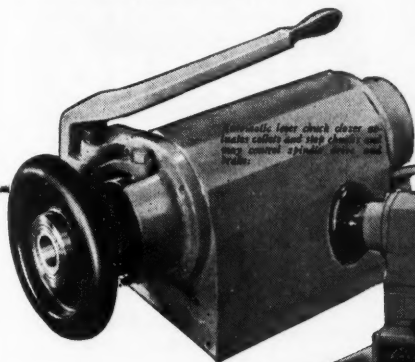
**Die Feeds . Dial Feeds . Slide Feeds
Pick-off Attachments . Stock Straighteners . Lamination Dies**

RIVETT

WHEN COSTS AND QUALITY COUNT THE *New* 918-S TURRET LATHE

If you machine small and medium sized parts from bar stock or on second operations — look to this new Rivett Turret Lathe. It is designed to buy its way into your plant with cost savings and quality control.

The 918S Turret Lathe cuts the initial cost of investment by taking work from larger machines. It follows by reducing the "dead time" of set-up and spoilage on



every job. Then it really pays with lowered time on every piece. How? — With the right spindle speed for efficient tooling, with quick means for chucking work, with properly grouped control levers and by reducing operator fatigue.

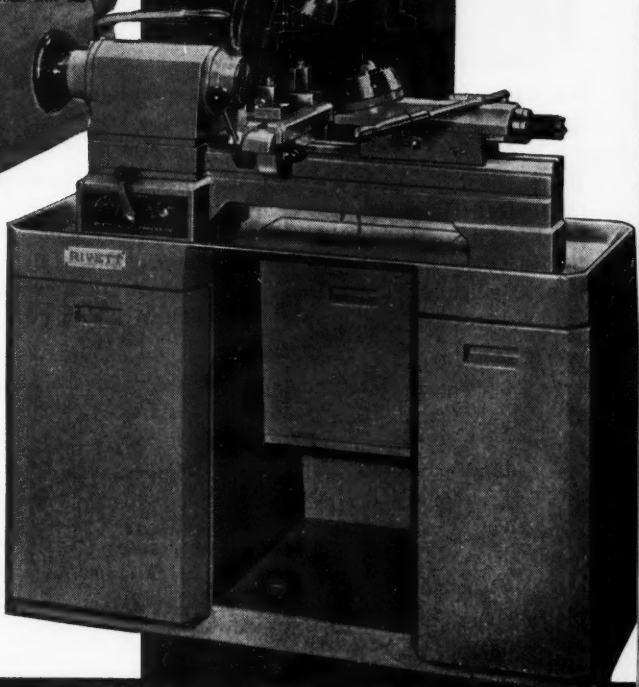
Features designed into the 918S Turret Lathe to guard quality include a rigidly mounted precision ball bearing spindle, precise tool indexing, hardened and ground steel bedways, vibration-free drive and mounting.

Write for Bulletin 918-ST

Stationary Collet — close without lateral movement to maintain perfect length on bar stock. Maximum capacity $\frac{1}{8}$ " round.

Draw-In Collet — new design holds work truer with greater gripping power. Maximum capacity $\frac{1}{4}$ " round.

Step Chuck — for accurate chucking of circular and irregular parts requiring only a short grip. Maximum capacity 6" round.



RIVETT LATHE & GRINDER, Inc.

BRIGHTON • BOSTON • MASS • U S A

from FLAT SURFACES

TO INTRICATE SHAPES



with the New
**DI-ACRO
BRAKE**

- RCK-LOK—new sensitive material clamp increases accuracy
- DOUBLE-EDGED FORMING BLADE allows close reverse bends
- NEW PRECISION STOPS accurately control angularity of bends

This versatile metal forming machine was developed for use in model shops, experimental laboratories and production departments where it often replaces dies for all types of precision forming operations. Di-Acro Brakes will form a great variety of materials including copper, bronze, stainless steel, aluminum and bi-metals.

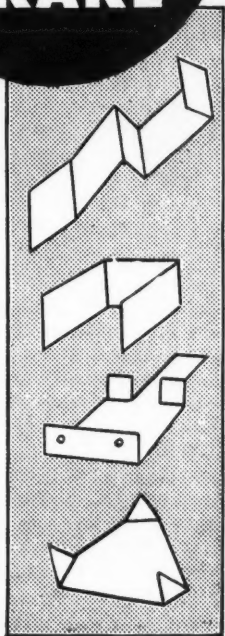
WRITE FOR CATALOG. New edition of 40-page Di-Acro Catalog contains detailed information on all Di-Acro Brakes, Shears, Benders, Notchers, Rod Parters, Punches and illustrates how these precision machines can be used individually or cooperatively for "DIE-LESS DUPLICATING."



◀ Di-ACRO is Pronounced "Die-Ack-Ro" ▶

O'NEIL-IRWIN MFG. CO.

306 8TH AVE., LAKE CITY, MINNESOTA



**MACHINE MORE PIECES
with FEWER CARBIDE TOOLS!**

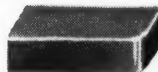
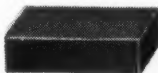
Improved **TECO** CEMENTED CARBIDE *outproduces*
other carbides 3 to 10 times

Another Typical Case

Part: Bearing Race (Railroad)
Material: S.A.E. 4320 (Rough forging)
Machine: Bullard 30" Cutmaster
Operation: Turning
Diameter: 8 1/2"
Length of Cut: 8"
Depth of Cut: 1/4" - 3/8"
Feed: .021"
Speed: 370 f.p.m.
Pieces per grind: 50
Best previous carbide production: 15
TECO 254 Right Hand Blank used
TECO Grade C used

TUNGSTEN ELECTRIC CORP. 39th ST., UNION CITY, N. J.
Branch Office: 403 Western Reserve Bldg., Cleveland 13, Ohio
Representatives: Indianapolis, Ind., Detroit, Mich.

Manufacturers of
TECO CARBIDE BLANKS and TOOLS



All standard sizes and
styles. When ordering any
carbide tools specify "Teco"
—no substitute."

FIRST, Improved TECO produces so many more pieces and stays on the job so much longer, you consume fewer tools while greatly increasing production.

SECOND, you can generally use the same grade of Improved TECO carbide for turning, facing and boring—rough and finish cut—as well as precision boring and reasonable intermittent cutting. Type A-1 for cast iron, non-ferrous metals, etc. Type C for steels. When a TECO tool is exhausted for roughing, continue to use it for finishing, right down to the last grind. No need for large or complicated stocks—no wasted carbide.

Try Improved TECO on any carbide job. You'll get more pieces between grinds, more grinds per tool, less down time and lower tool cost. Send details of your machining problems for recommendation.

Catalog and Price List on request

Improved
TECO
CEMENTED CARBIDE

Manufacturers of Tungsten Carbide—from ore to finished material—for over a quarter century.

**BOTH*
AGREE
ON**



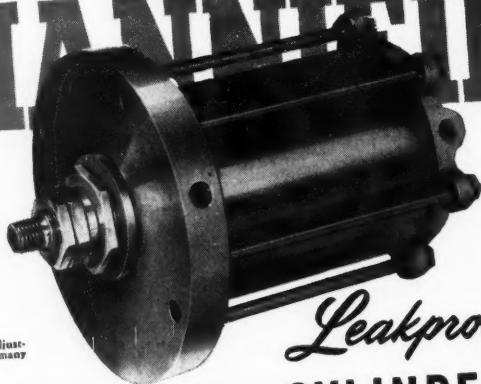
A Model JR cylinder with adjustable cushion — one of many different types.

Product Designers

Specialists in product design have placed their stamp of approval on Hannifin Pneumatic Cylinders because Hannifin gives them what they want: A completely standardized line of cylinders, available in an almost infinite number of combinations. Any length of stroke specified,

double acting or single acting. A wide choice of mounting styles, single or double end rods. Diameters from 1" to 12", or larger. Cushions for head end, rod end or both. Complete engineering data for working out cylinder applications in Hannifin Bulletin No. 57- I.

HANNIFIN



Leakproof
PNEUMATIC CYLINDERS

**Also on...*
HANNIFIN
"Packless"



**AIR CONTROL
VALVES!**

Operating Engineers

Plant operating engineers like Hannifin Pneumatic Cylinders because they seldom require maintenance — thanks to Hannifin's exclusive "Leakproof" design which permits external adjustment of piston packing without disturbing any internal parts. They also like the smooth, free-running performance that comes with cylinders made

by Hannifin: TRU-BORED from steel cylinder stock; honed to satin finish by exclusive long-stroke honing process. This is also their assurance of full power performance and protection against air waste. For better plant operation, get genuine Hannifin cylinders. See your local Hannifin representative, or write.

HANNIFIN

*Nationwide
Sales and
Service*

HANNIFIN CORPORATION

1101 So. Kilbourn Ave., Chicago 24, Ill.
AIR CYLINDERS • HYDRAULIC CYLINDERS • HYDRAULIC PRESSES
PNEUMATIC PRESSES • HYDRAULIC RIVETERS • AIR CONTROL VALVES

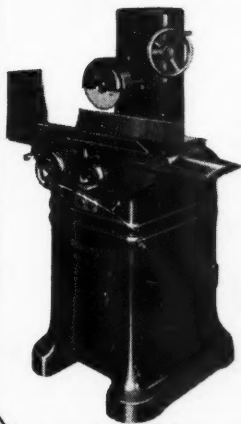
MODEL 6-12

THE TOOL MAKER'S
"Personal Grinder"

MODEL 6-18 SURFACE GRINDER

An extremely accurate Surface Grinder, highly recommended for tool room work and gauge grinding. Its rugged construction and superior engineering assure constant accuracy for a longer period than is usually expected of the ordinary surface grinder.

Write for Catalog



BOYAR-SCHULTZ BENCH MODEL SURFACE GRINDER

This sturdy, accurate Surface Grinder, mounted on the tool maker's bench, is quickly available for many small jobs that would otherwise go to the Grinding Department, interrupting important production runs. It is built with many new features and to the well known Boyar-Schultz standard of quality for close tolerance grinding on tools, dies, jigs, fixtures and gauges. An ideal tool for the small shop.

Write for Catalog and New Low Prices

PEDESTAL FOR MODEL 6-12 GRINDER

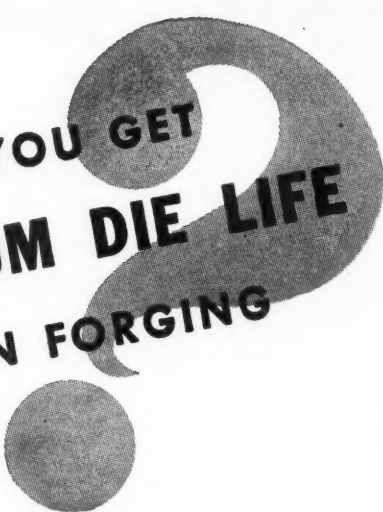


Made from heavy gauge angle iron, welded for rigidity and strength. With it, Model 6-12 Grinder becomes a Pedestal Machine.



BOYAR-SCHULTZ CORPORATION
2120 Walnut Street

Chicago 12, Illinois



**DO YOU GET
MAXIMUM DIE LIFE
WHEN FORGING**

Here is a challenge . . . use the Fiske Hot Die Compound we recommend for your job and compare the results with those obtained from any other product used for the same operation. The results . . . longer die life, more pieces between changes, smoother surface, no carbon formation on dies are our bid for your future business. Fiske Products are sold on a "results" basis. Write today for information.

FISKE

Metal Working

LUBRICANTS

FISKE BROTHERS REFINING COMPANY

Established 1870

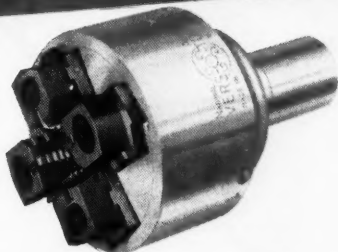
NEWARK 5, N. J.

TOLEDO 3, OHIO

Announcing

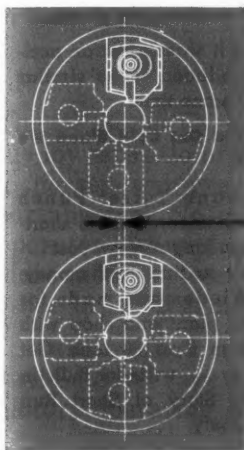
AN ENTIRELY
NEW PRINCIPLE

Adjustable-blade Chasers



for standard circular chaser  VERS-O-TOOL heads

HERE'S WHAT ADJUSTABLE-BLADE CHASERS WILL DO FOR YOU



- 1 Cut Your Tool Costs.** Adjustable-blade chasers are inexpensive, ideal for medium and short-run jobs. Use them on the same Vers-O-Tool head that you use with circular chasers for the long-run jobs. Two sizes of blade holders and seventeen sizes of blocks cover the range of the six standard self-opening Vers-O-Tool head sizes from $\frac{3}{8}$ " to $1\frac{5}{8}$ ".
- 2 Increase the Range of Work You Can Economically Handle.** Adjustable-blade chasers will thread, turn or end-form, just like circular chasers. They regrind just as accurately, and can be replaced just as fast—yet they cost less. Tool investment is low enough to permit use for all threading, no matter how short the run.
- 3 Provide This Adjustment for Regrind Wear.** Regrind as often as necessary. You can keep chaser blades at top operating efficiency without fear of spoilage if the run is interrupted. The take-up adjustment of the block allows you to bring the cutting edge up to the center line after every grind.
- 4 Minimize Chatter Marks.** The cutting edge is always in the proper position on the transverse axis of the work. Positive adjustment of the blade-holding block prevents improper positioning; and the tool is designed for minimum overhang—it's always up close to the work.
- 5 Increase Your Machining Accuracy.** Regrinding and repositioning the blades is a simple matter, whether you use adjustable-blade or circular chasers. Both are brought back to original toolroom accuracy by a minimum grind-off—and both may be checked in the same micrometer gage, insuring precise adherence to original thread form. There's no excuse for finishing the run with dull cutters when you're using the Vers-O-Tool.

For more detailed information on adjustable-blade chasers ask for Bulletin D-47.

The NATIONAL ACME CO.

170 EAST 131st STREET • CLEVELAND 8, OHIO

Acme-Gridley Bar and Chucking Automatics:
1-4-S and 8 Spindle • Hydraulic Thread
Rolling Machines • Automatic Threading Dies
and Taps • The Chronolog • Limit Motor Starter
and Control Station Switches • Solenoids
Centrifuges • Contract Manufacturing

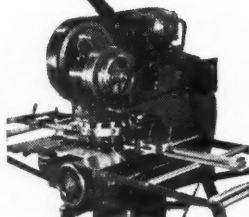
WE SHOWED HIM

HE PASSED OUT COLD WHEN



TYPE R-4P POWER-DRIVEN TURRET PUNCH PRESS

Furnished with 12 punches and dies up to 1 1/4" diameter, mounted in a revolving turret. An accurate, positive indexing device locks the revolving turret when the selected punch and die are located centrally under the ram. Locking lever positively prevents operation of the machine unless turret is properly positioned and index lever locked in place.



He didn't believe it could be done! We had told him that a Wiedemann Turret Punch Press could position and pierce sheet metal up to 3/4" thick in a matter of seconds. He didn't believe it could be done! When we told him we could pierce a given number of holes of *different shape and diameter* in a matter of minutes, it was just too much for him. So we had to show him.

We took a sheet of mild steel 48" x 96".

We pierced 24 openings requiring 6 different shapes and diameters.

The old method for the same job took 2 hours and 10 minutes.

With a Wiedemann R-7, we were able to finish the entire job in 12.57 minutes. . . and this included loading and unloading the material in the machine.

To prove it wasn't just an accident, we produced three similar pieces in the same time.

He Passed Out Cold When We Showed Him!

Wiedemann Turret Punch Presses are engineered to do short-run piercing at long-run low cost. . . true economy in time and money. There's a Wiedemann made for every type of plant and shop with capacities from 8 to 80 tons. Get the facts today . . . write for Bulletin 92 . . . The Story of Short Run Piercing Economy.

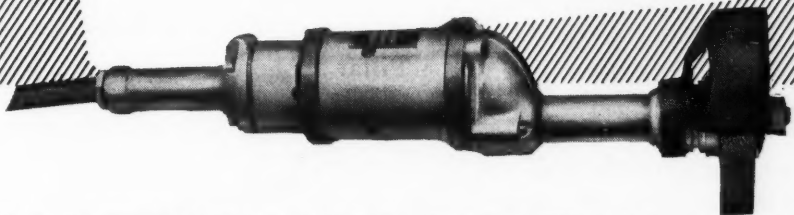
WIEDEMANN MACHINE COMPANY

4219 WISSAHICKON AVENUE
PHILADELPHIA • PENNSYLVANIA

*Faster...
Lighter...
more Efficient*



CP SUPER CYCLE
ELECTRIC TOOLS



The CP Super Cycle Grinder has the lowest ratio of motor weight to horsepower ever built into a portable tool. No speed sag when operator bears down. Removes more metal at less cost than any other type of grinder.

Maintenance is remarkably low. Squirrel cage induction type motor, operating on 360 cycle,

3-phase, 220 volt current, has no brushes to replace, no armatures to burn out.

Complete line of CP Super Cycle tools includes grinders, sanders, polishers, buffers, screw drivers, drills, nut runners, tapers, in wide range of speeds.

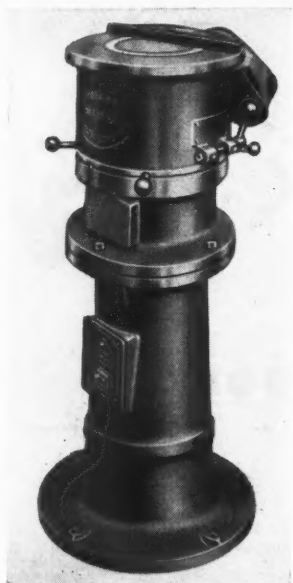
Write for full information.



**CHICAGO PNEUMATIC
TOOL COMPANY**

8 East 44th Street, New York 17, N. Y.

ELECTRIC TOOLS • AIR COMPRESSORS • PNEUMATIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES



WRIGHT BRITISH BUILT TABLE SURFACE GRINDERS

Made in two sizes 8-inch, Bench or
Pillar as shown on left.

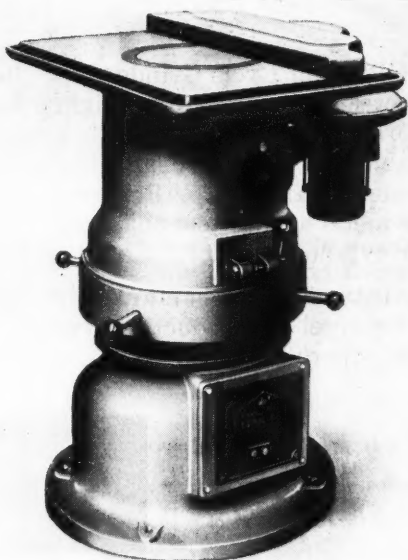
12-inch Standard as
shown on right, and with
Table extended for
Cylinder Heads.

*Write now for literature.
Agents wanted.*

**DOWDING &
DOLL LTD.**

(Established 1919)
GREYCOAT STREET,
WESTMINSTER,
LONDON, S. W. 1

Cables: Accurateol, London.
Codes used: Bentlys, A.B.C.
5th and 6th edition.



NOT JUST A
NEW MACHINE

-A New
Method

The Motch & Merryweather

No. 00-T

Automatic
TRANSFER MACHINE

*Triple-
Chip
METHOD*

A Complete Range of Sizes is Now Available

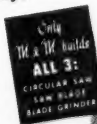
A new method, definitely. There are no other machines like the No. 00-T M. & M. Transfer Circular Sawing Machine. It "operates on" both ends of solid bars or tubing *simultaneously*. It cuts stock to *square*, accurate milled lengths by the Triple-Chip Method and transfers it to a second station to be machined on both ends while the next piece is being sawed. Both inside and outside diameters, for example, can be chamfered. Operation is automatic from start to finish. Eliminate costly second operations! Get the details now.

Ask for our well illustrated Bulletin "D-100".

*"Yes, Sir, it's
Really Automatic"*



The No. 00-T cuts automatically to length. Transfers to second station. Machines both ends (threads, center drills, reams, faces, chamfers). Operates automatically.



THE MOTCH & MERRYWEATHER MACHINERY CO.
PENTON BUILDING CLEVELAND 13, OHIO

YOUR COMMAND • AN UNPARALLELED EXPERIENCE IN CIRCULAR SAWING



*You can cut
SHAPES
LIKE
THESE
faster on the*
SHEAR-SPEED
SHAPER
a gear shaper
a contour former
an external
Broaching Machine



Write for Bulletin 1800-47

MICHIGAN TOOL COMPANY

7171 E. McNICHOLS ROAD • DETROIT 12, U. S. A.

NEW!

SOUTH BEND 14" Drill Press

South Bend presents this new 14" Drill Press as a companion to the South Bend Precision Lathe. It is built with the same high standards of accuracy and skilled workmanship. It is a superior tool unsurpassed for accuracy, easy operation, dependable performance.

FEATURES and SPECIFICATIONS

BELT TENSION RELEASE

Quick-acting belt tension release lever simplifies speed changes. Keeps tension correct.

BUILT-IN LIGHT

Provides shielded illumination for work area. Separate on-off switch.

SPINDLE

Free-floating design prevents misalignment, side thrust, and whip. Travel 4"

BALL BEARINGS

Sealed, precision type. No oiling. 2 on spindle drive unit, 2 on spindle.

QUILL BEARING ADJUSTMENT

Compensates for wear.

DEPTH GAUGE

Graduated in inches. Adjustable collars control feed and return.

RUGGEDLY CONSTRUCTED

Precision-built for industrial and all other types of shops.

TWO MODELS

Bench or floor type.

CAPACITY

Maximum drill size in iron or steel $\frac{1}{2}$ "
Drills to center of 14" circle.

CHUCK

Capacity 0 to $\frac{1}{2}$ "

SPEEDS

Four—707 to 4322 r.p.m.

CHUCK TO BASE DISTANCE

Bench Model . . . 17"

Floor Model . . . 46 $\frac{1}{8}$ "

TABLE SIZE

10" x 10" . . Tilt Type

COLUMN

2 $\frac{3}{4}$ " diameter. Accurately ground.

HEIGHT

Bench Model . . . 35 $\frac{1}{2}$ "

Floor Model . . . 65 $\frac{1}{2}$ "

SHIPPING WEIGHT

Bench Model . . 195 lbs.

Floor Model . . 235 lbs.

MOTOR REQUIRED

$\frac{1}{3}$ h.p., 1725 r.p.m.

Vertical mounting. On-off switch provided.



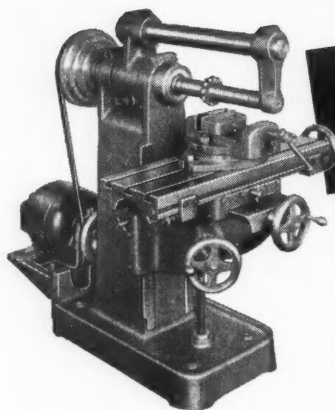
\$98⁰⁰

f.o.b. factory, bench model
with chuck, extension cord
and switch; less motor.



SOUTH BEND LATHE WORKS

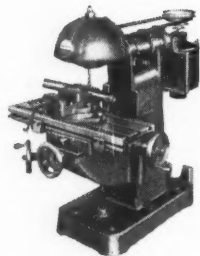
BUILDING BETTER LATHES SINCE 1906 • 427 EAST MADISON ST., SOUTH BEND 22, INDIANA



BENCHMASTER pays off 5 ways!

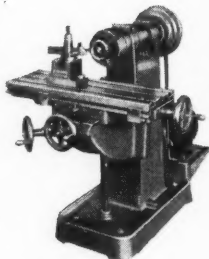
Where else can you find a low cost tool with so many cost-cutting possibilities?

1 FOR HORIZONTAL MILLING quill and overarm slip quickly and snugly in place. Timken Tapered Roller Bearings provide a rigid spindle support at high speeds as well as low. No. 2 Morse Taper. 12½" horizontal table travel with a big 6" x 18" table area.



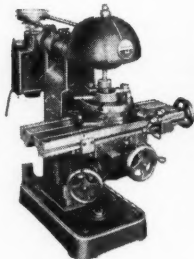
2 WANT A VERTICAL MILLER?

The same machine is quickly converted by substituting this special head. Again Timken Tapered Roller Bearings give smooth, chatter-free performance over a wide speed range. Accessories available: Full line of Benchmaster collets and drawbar; swivel-base vise.



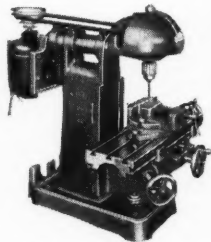
3 WHEN IS A MILL NOT A MILL?

Here's a handy kink to obtain extra *lathe* facilities for facing, turning, forming, etc. Benchmaster Accessories required: Tapered Adapter and Tool Block. By lowering knee position and raising tool you can swing up to 23". Exceptional capacity!



4 QUICK CHANGE ARTIST

Here's the Benchmaster converted to a grinder! Free-rolling bearings maintain high spindle speeds without overheating or risking bearing injury. Grinds internally, surfaces, sharpens cutters, etc. Note Benchmaster 6" Rotary Table—a fine accessory.



5 AND NOW IT'S A DRILL PRESS

The No. 2 Morse Taper in spindle accepts standard Jacobs Chuck Shank. Raising table feeds work into drill. With this setup, drilling layouts is easy—simply measure off correct hole spacing with the lead screws.

NOTE: BENCHMASTERS are also available with rack and pinion feed. For production work this provides exceptionally fast operation.

BENCHMASTERS are accurately built with all the care and precision of larger, more expensive tools . . . yet may be purchased for a fraction of big machine cost! Get our circulars on all **BENCHMASTER EQUIPMENT!**

Write Dept. MM.
for information

benchmaster

MANUFACTURING COMPANY
2052 WEST PICO BOULEVARD
LOS ANGELES 4, CALIFORNIA

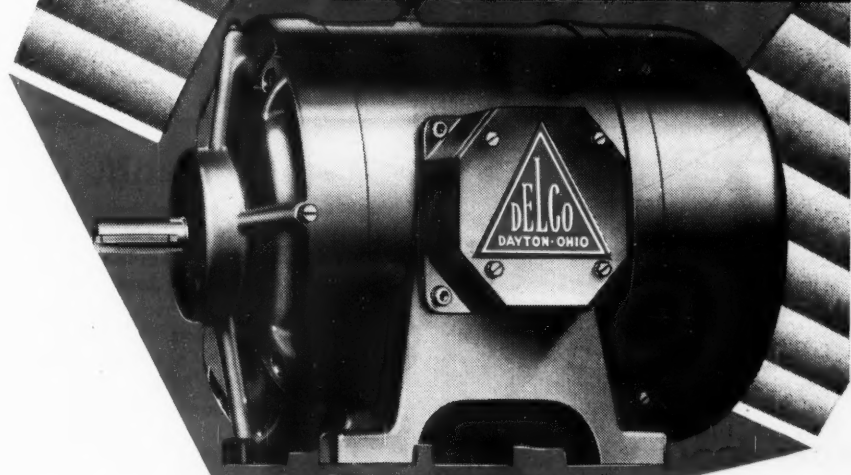


- ★ For Precision
- ★ For Quality
- ★ For Value

You can't beat a
BENCHMASTER!

built to keep going

where the going's toughest!



**CHECK THESE FEATURES
OF THE NEW
DELCO MOTOR**

Totally enclosed; fan-cooled.

Individually taped coils.

Thoroughly insulated windings.

Unit-cast, ball-bearing rotor,
dynamically balanced; parts in-
terchangeable end to end.

Double-shell frame with new
simplified cooling system.

Extra-large, watertight con-
duit box; usable in four 90-
degree positions.

Extended, accessible mounting
feet, cast as a unit with main
frame.

From 1 1/2 h.p. through 50 h.p.;
NEMA frame sizes, 224 through
505.

THE NEW DELCO MOTOR

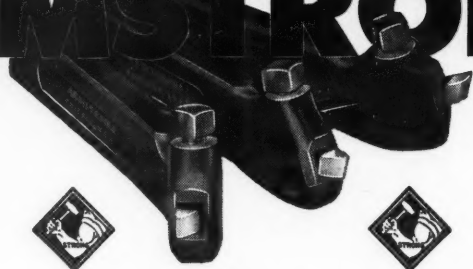
Sand, scale, dirt and dust in the air? Forget it! Completely protected by its totally enclosed, double-shell frame, this great new Delco Motor takes all these in its stride.

Everything about the new Delco Motor promises a superior kind of steady, cool-running performance. New materials and new design practices make it more rugged, better ventilated and insulated. New simplicity and accessibility make maintenance a much less frequent and less costly process.

Put this really new motor to work in foundry, factory, mill or forge plant—*anywhere* conditions are tough—and watch it prove its outstanding value! Write for complete data.

DELCO  **MOTORS**
DIVISION OF GENERAL MOTORS CORPORATION

ARMSTRONG



**MORE TOOLS
PER MAN
FOR
MORE PROFIT!**

Even when labor was cheap and tools were costly, it was the best tooled shops that prospered. Now with wages higher and the work days shorter, it becomes imperative that every worker be supplied with every tool that will increase his hourly production.

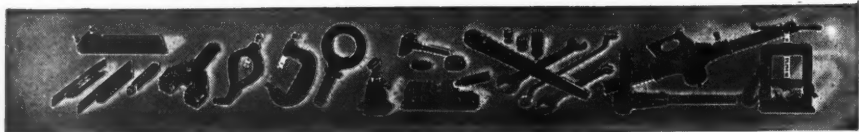
See that each lathe, planer and shaper operator has the correct ARMSTRONG TOOL HOLDERS for each operation he performs. Equip each machine with its full complement of ARMSTRONG Setting-up Tools. Use better balanced, handier ARMSTRONG WRENCHES on machines and assembly lines. Specify ARMSTRONG Drop Forged "C" Clamps and Lathe Dogs . . . Today, only quality tools can be truly economical.

Write for the ARMSTRONG Catalog. It has page after page of production-increasing, cost-cutting tools.

ARMSTRONG BROS. TOOL CO.
"THE TOOL HOLDER PEOPLE"

5228 W. Armstrong Ave., Chicago 30, U.S.A.
New York and San Francisco

Armstrong Tools are Stocked by Industrial Distributors.



MODERN Machine Shop

NOVEMBER, 1947

CINCINNATI, OHIO

VOL. 20, No. 8

This Month

THIS month's feature article takes the reader on an "arm-chair" tour of the Angus Shops of the Canadian Pacific Railway, at Montreal, Canada, in the course of which a number of unusual and interesting tools are presented. The shop equipment includes machine tools for which the Canadian Pacific has drawn upon American, Canadian and English manufacturers. Some of the fixtures and accessories were supplied by tool manufacturers, but many were designed and built in the Angus Shops. The description of the C.P. method of reclaiming high speed steel will be interesting to American railway shop executives.

In his second article on the subject "Spinning and Panel-Beating of Aluminum Alloys", Mr. E. R. Yarham continues his discussion of the British methods of fabricating aluminum. In addition to details regarding the special tools required for spinning, the author presents a step-by-step account of the procedure involved in the forming of aluminum workpieces by the spinning method. Page 138.

Although the cost of material handling is listed on the cost sheet as a non-productive expense, this item is an important part of manufacturing cost. Further; in the majority of manufacturing plants the efficiency of the plant is very largely based upon the efficiency of the material-handling system. The material-handling methods and equipment in use at the Ithaca plant of the Morse Chain Company have some excellent features, all of which are described by R. O. Erickson, Material-

Handling Supervisor at the Morse Chain Company. Page 164.

A few pointers on good foremanship are presented by Ernest W. Fair in his article "Good Foremanship Is Important," which will be found on page 180. Mr. Fair has been a plant executive, so he knows whereof he speaks.

In the "Modern Equipment at Work" department a number of standard commercial tools are shown in use on unusual and especially interesting jobs. One article describes the manner in which a progressive dual seam welder is used to expedite the work and reduce costs on the production of panels for trailer bodies. Another tells and shows how cemented swaging blocks can be used to save wear on dies; a third describes a fixture that holds 13 pieces for borizing, turning, facing, chamfering, and machining seats. The fourth describes a method of using "laminated" fabrication in the construction of a bending die. The superiority of the laminated construction has been proved in actual operation.

The "Ideas from Readers" section presents several "home-made" tools and devices for which commercial tools were not available, including a useful drill jig for uneven workpieces, a method of blocking up a drill press column to provide additional capacity, a device for centering milling cutters, a good toolpost guide for making wire springs, and an unusually efficient rigging to facilitate roll welding.

The usual laugh will be found on page 364, and the editor will get a few things off his chest in his "Over the Editor's Desk", which is on page 366,

C. P. Shops Are Completely Equipped

The Angus Shops of the Canadian Pacific Railway Comprise an Excellent Example of Modern Practice in Rolling Stock Maintenance

By HOWARD CAMPBELL

CANADA has few railroad shops, but among these is one that ranks among the best on the North American continent. That one is the plant that is known, collectively, as the "Angus Shops" of the Canadian Pacific Railway at Montreal, Canada. The Angus Shops includes a machine shop, locomotive shop, car shop, foundry, forge shop, reclamation dock for salvaging materials, a power plant which supplies the steam and electricity for the entire works, and the necessary offices for the conduct of the works.

Covering 250 acres, the plant includes 31 main buildings and 37 auxiliary buildings, together with 50 miles of track. The foundries alone are a sizable industry, producing some 80,000 freight car wheels per year on an average of 320 wheels per working day, and 20 tons per day of gray iron castings. The forge shop turns out approximately 15 tons of forgings per day, and a day's output from the nut and bolt shop will consist of 15,000 bolts, 2,000 pins, 6,000 lb. of nuts and 5,000 lb. of rivets.

To maintain its schedule, the Angus Shops uses 30,000 tons of steel and 17,000,000 feet of lumber per year. All of this material is applied in number

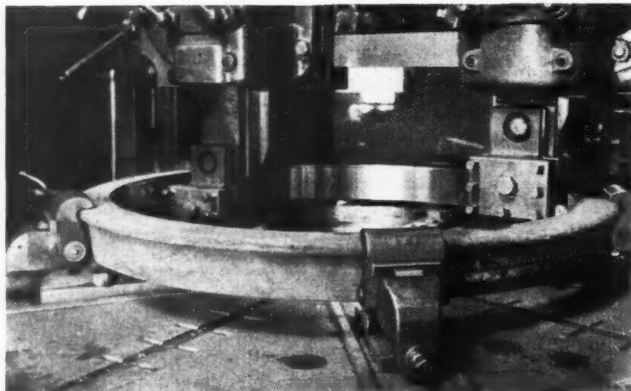


Fig. 1—Fast, positive action is the feature of the jaws by which the tire is clamped to this boring mill table.

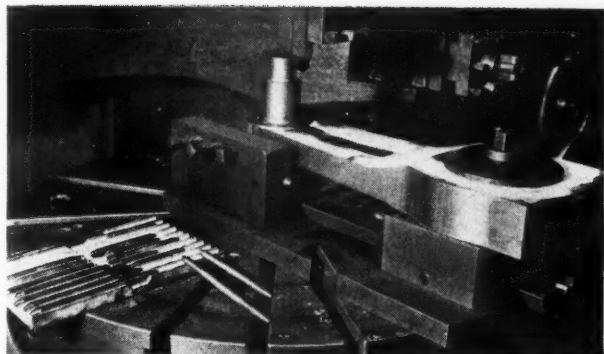


Fig. 2—Several different sizes of crank arms can be machined in the fixture shown here. This tool was designed by Angus engineers.

one general repairs on 300 locomotives, 1,000 passenger cars and 19,000 freight cars. The approximate value of the stock carried in stores is \$5,000,000 and the yearly issue amounts to \$20,000,000. Worn and damaged parts from the entire system to the amount of 250 tons per day are sent to the Angus Shops for reclamation, the total savings on which amount to some \$250,000 per year. In addition, scrap metal in the form of shavings and chips is marketed to the amount of \$2,000,000 per year.

Power to operate the equipment in all of these shops is supplied from the Shop's own powerhouse, which houses two 100,000 lb. per hour steam generators. Electricity to the amount of 1,600,000 kw. hours, 3,000,000 cu. ft. of water and 800,000 cu. ft. of gas are supplied to the shops per month.

The performance of the many and various tasks involved in these extensive operations requires a force of more than 7,000 mechanics, clerks and supervisors, including some 290 apprentices.

The shop equipment includes machine tools and other manufacturing equipment for which the Canadian Pacific has drawn upon American, Canadian and English manufacturers. Some of the accessories were supplied by the tool manufacturers, but many

simplify laborious or difficult jobs by the use of labor-saving devices.

Among the accessories that perform a simple but effective service are the jaws for holding tires on the boring mill shown in Fig. 1. Five special jaws are mounted on a Universal boring mill table and the jaws are so arranged that when a tire is placed in position, the holding down portion of each jaw can easily be swung outward at a 45-



Fig. 3—Drilling the clamping bolt hole in a crank arm. The hole is drilled half way, then the jig is reversed and the operation is repeated.

Fig. 4—Profile grinder for grinding tire tools to form. Two of the cams that control the action of the table are shown at the right.



deg. angle to permit the tire to be placed in position. While in position the tire rests on movable serrated pads which form part of the jaw body proper and which may be quickly adjusted for any uneven surfacing of the tire. The clamping jaws are then swung forward into position over the top flange of the tire and being controlled by a fulcrum hinge which is actuated by projecting screws, exert a downward pressure which ensures that the tire is firmly held in place during the machining operation and eliminates

any distortion or out-of-round stresses.

The tools for turning the valve connecting rod ends of crank arms are shown in Fig. 2, as arranged on a vertical type Bertram boring mill. The fixture is similar in design to the type usually employed for this job; the machined hole in the crank arm end fits over a locating pin and the connecting

rod end that is to be machined is held in position by set screws applied from both sides. The feature of this fixture, however, is that the locating pin for the hole in the crank arm is mounted on a platen which is arranged with a slide movement. Thus, by adjusting the platen to provide the correct distance between centers, the fixture can be

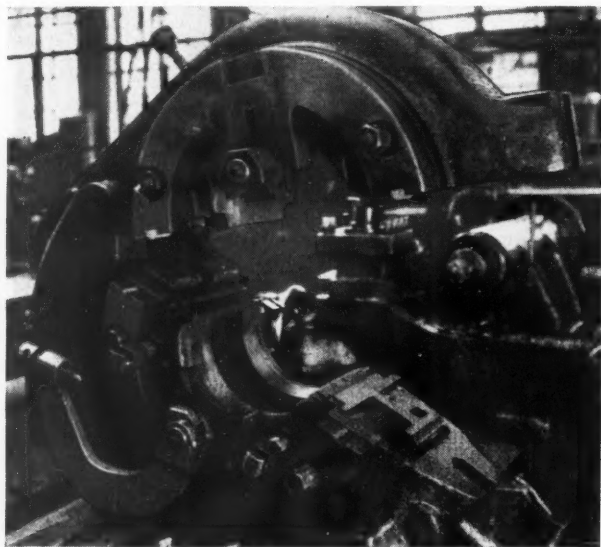


Fig. 5—This driver makes it possible to machine journals on car axles without removing the wheel from the axles.

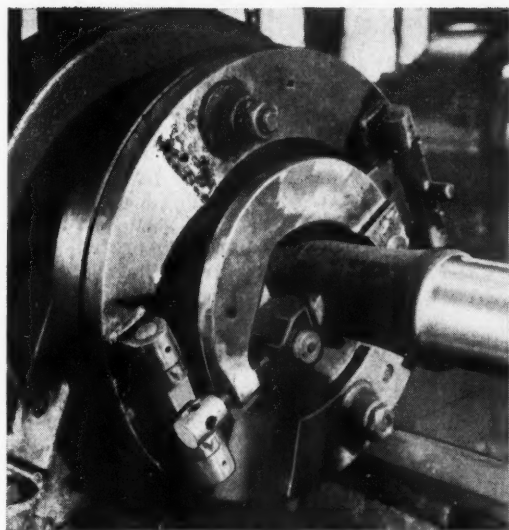


Fig. 6—Driver for use in remachining axles. The clamping device consists of a C-shaped clamp mounted on a sliding jaw.

the upper and lower sides of the fixture. Correct adjustment is quickly obtained by setting the arm so that the layout line on the face of the arm is in line with the point of a locating pin mounted in a holder that extends downward from the upper side of the fixture.

When properly positioned for drilling, a collar is slipped over the locating pin in the large end of the piece and a wedge is driven in to lock the crank arm in position as shown. To maintain accuracy and eliminate run-out in the use of extremely long drills the hole is drilled only half way

used for machining crank arms of various dimensions.

Several sizes of bushings are provided to fit holes in the crank arm and locating pin on the platen, and a set of spacing pins as shown on the machine table at the left is provided to gauge the correct distance between centers for the different sizes of crank pins.

Holes for the clamping bolts used in crank arms are drilled in the jig shown set up for operation in Fig. 3. The crank arm is located in the jig by slipping the hole in the large end of the crank arm over a bushing on the locating pin which is part of the jig. Adjustment is provided for the opposite end of the arm, in order to ensure accurate drilling, by adjusting screws in

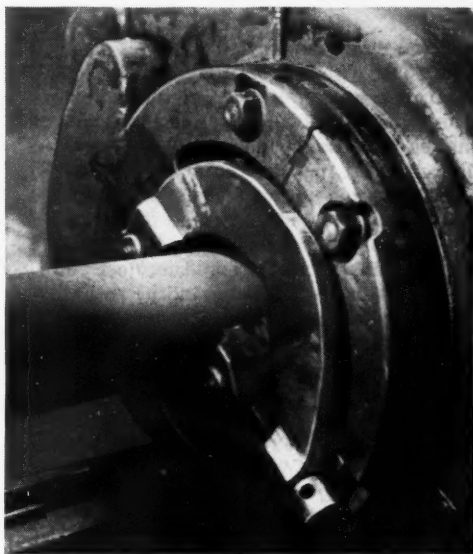


Fig. 7—This view shows the sliding jaw upon which the clamp is mounted to hold axles for remachining.

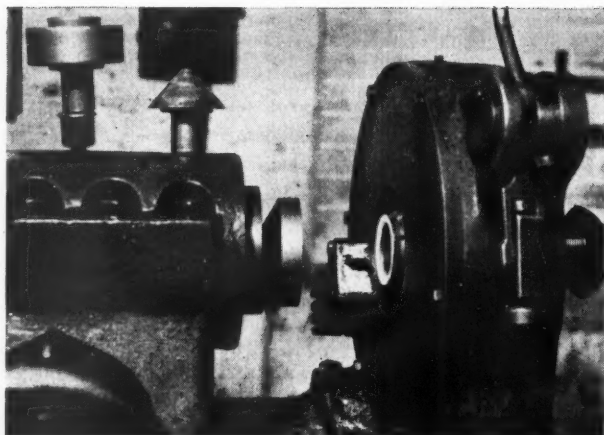


Fig. 8—Machine for flanging copper pipe and tubing. With this equipment a flange can quickly be rolled back to a 45-deg. angle in reverse.

through, then the fixture is reversed, complete with the work, to drill the other half of the hole through the opposite side of the piece. Accurate drill bushing guides are used in the fixture for the drilling of this crank arm.

The machine shown in Fig. 4 is a profile grinder specially used to grind cutting tools to conform to flange and tread of locomotive and car wheel tires. In operation, tools are clamped in the grinding position upon a movable table which is arranged for angle clearance and equipped on the under side with a cam arrangement that makes it possible to grind any tool contour that may be required. The interchangeable contour piece as shown on the right in Fig. 4 is so designed that it only requires one or two minutes to interchange for the desired profile required. The grinding table can be raised or lowered as required relative to tool height. The machine is precision-built and form tools produced on this machine maintain a very close working accuracy.

In order to remachine journals mounted on car wheels, this work is carried out on a C.M.C. journal truing lathe designed for machining mounted car wheels. It may be noted in Fig. 5

the axle and replace the two-piece driver clamp that formerly was manually applied in each operation of journal turning.

With the work in position as shown in Fig. 6, and the drive mechanism closed and locked, a "C" clamp is swung into position over the axle and two or three turns of an adjusting screw tighten the grip on the wheel

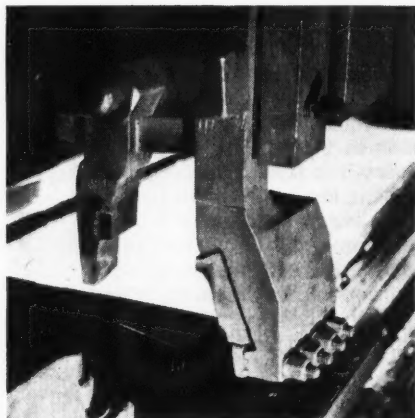


Fig. 9—Double tool setup for remachining angle bars. With these tools 104 hard steel angle bars have been remachined in eight hours.

journal. Lateral movement is arranged for on this driver to take care of rough, unfinished axles.

Another type of axle lathe driver, shown in Fig. 7, is used in the machining of unmounted axles in which the axle is passed through the center driving head in the axle lathe. The clamp device similar to that used on mounted car wheel journal turning, consisting of "C" clamp mounted in a

are mounted in the driving head on the end of a spindle which is mounted in a housing at the left. The spindle is controlled horizontally by a hand wheel which does not show in the illustration.

The face of the driving head has a bored hole at a 10-deg. angle off the horizontal plane of the spindle in which flanging dies are applied. As the spindle revolves, the oscillating action of the die produces the flange on the end

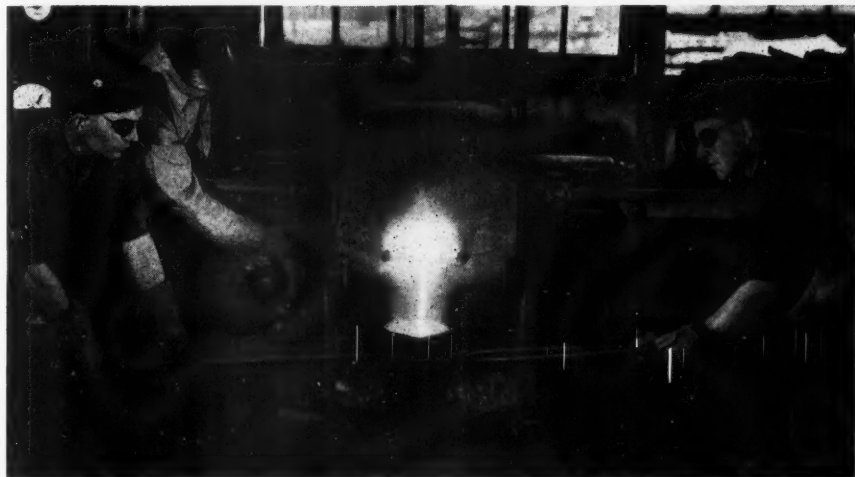


Fig. 10—The electric furnace shown here is used to salvage scrap high speed steel. As many as four heats are run per day, three days a week, salvaging approximately 80 lb. of steel per heat.

sliding jaw and the opposing fastening grip is arranged to swing outward so as not to obstruct the entrance of the axle in and out of the machine. This type of driver has compensating movement as applied to rough turned axles.

The piece of equipment shown in Fig. 8 is an Angus-made machine for flanging copper pipe and tubing of various kinds. The pipe is held in position by means of the collet chuck mounted at the right. The collets are in three sections and designed for 1/2-inch to 3-inch copper or iron pipe flanging. The dies used in the flanging operation

of the pipe. Three dies are used to complete a flanging operation; the first, which produces a 45-deg. angle on the pipe, the second, which flattens the flange, and the third, which rolls the flange back to a 45-deg. angle in reverse. Three minutes is the average time to complete a flange joint on this machine.

Angle bars removed from road service to be remachined for free rail head clearance are economically handled on a heavy duty frog and switch planer. The tool setup for planing angle bars, employing a double tool, is shown in

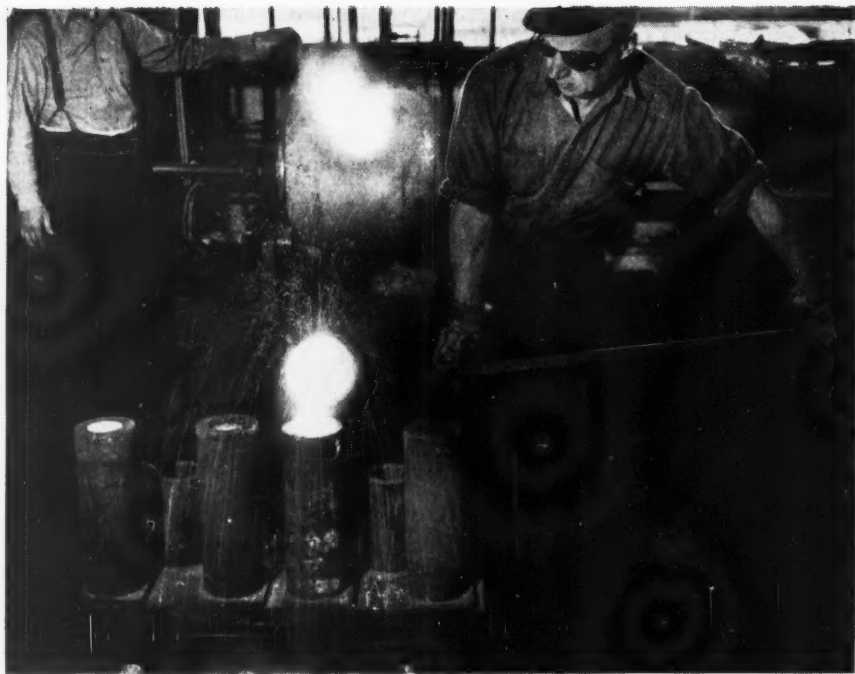


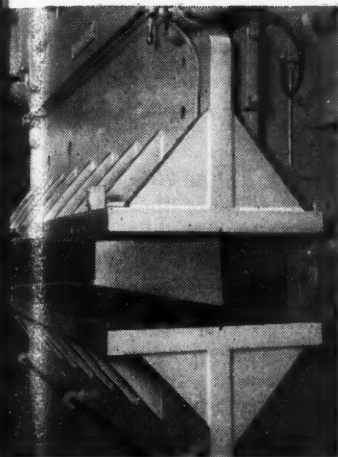
Fig. 11—"Pouring off" remelted high speed steel into ingots.

Fig. 9. The tool shown at the right machines the under side of the angle bar using a special tool holder in which an alloy cutting form tool is inserted. The form tool is clamped in place with a serrated holding edge which prevents slippage and permits the tool to be projected outward as required. The form tool is 6 in. in length and is face-ground when sharpening becomes necessary. Several thousand angle bars are produced per life of each forming tool.

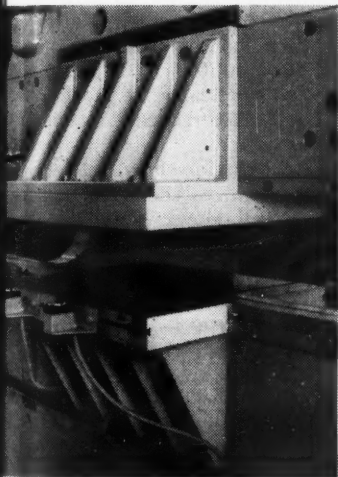
The angle bars are set up in a holding jig, with the existing holes in the angle bars being used to clamp the bars for the machining operation. Four to six angle bars are machined per setting. Cutting tool edges are spaced one inch over the width of the angle bar and set to a master $\frac{1}{8}$ in. and locked on the planer table. The right-hand form

tool is applied in the first machining operation and the left-hand tool is engaged in the finishing operation. To date, more than three-quarters of a million angle bars have successfully been reclaimed by this method. The purchase price of angle bars averages \$1.68 per pair and angle bars being reclaimed by the use of the tools shown average \$0.42 per pair all charges.

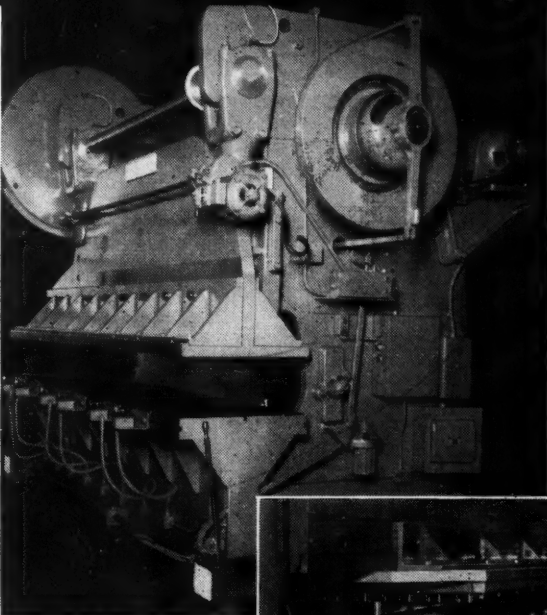
One of the most interesting of the salvage operations is the reclamation of high speed steel. All of the scrap tool bits and other pieces of high speed steel are saved and re-melted in the electric melting furnace shown in Fig. 10, after which it is poured into ingots. The ingots are then used to make tools of various kinds and shapes, being forged to the desired shapes and sizes in the forge shop.



Large area, permanent wide bed and ram for press work

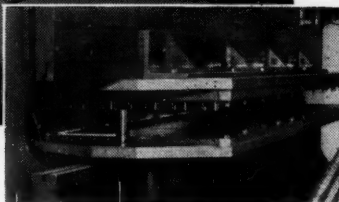


Large area, removable upper and lower brackets



Short, special purpose, removable upper brackets

Large area, removable upper brackets



JUMBO DIE AREAS..

on CINCINNATI PRESS BRAKES

With Cincinnati wide rams and beds, Cincinnati Press Brakes are now being used for both PRESS and PRESS BRAKE work.

These wide rams and beds are of two basic types—the permanent type for Press work only; the removable bracket type for general purpose requirements. With removable brackets, Cincinnati Press Brakes are dual purpose and function as Presses but also retain all the versatility of a Press Brake.

Both removable and permanent types of wide rams and beds are furnished in dimensions and areas to fit your particular requirements. We illustrate some of the combinations available.

Investigate!! Our Engineering Department will be glad to advise you on the profit and production possibilities of this new development in your shop. Write for Catalog B-2.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO U.S.A.

SHAPERS • SHEARS • BRAKES



Fig. 12—Good sections of air hose are reclaimed by removing the worn parts with this air-operated knife.

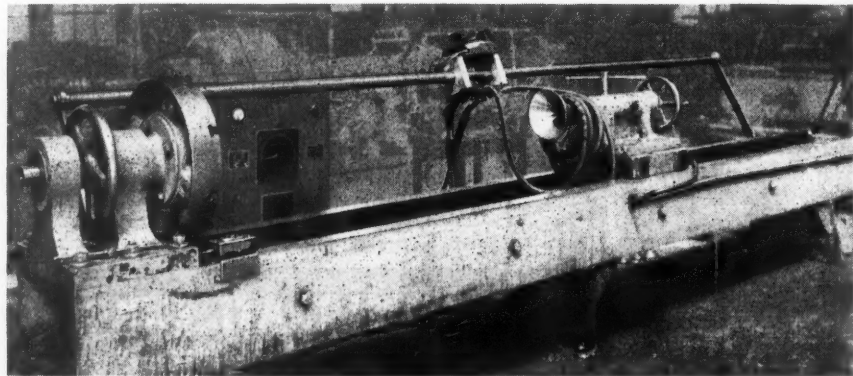
not exceed a total of 50 cents per lb., which means a saving of approximately 50 per cent in high speed steel purchase. All wastage of high speed steel is eliminated except for the loss in grinding. Re-melting operations are scheduled so that there are approximately three tons of ingots on hand at all times. The "pouring off" operation—pouring the molten high speed steel into the ingots molds—is shown in Fig. 11.

Train line air hose is reclaimed by cutting off the worn parts with the air-operated hose cutter illustrated in Fig. 12. The knife, which is made by grinding a worn hacksaw blade to a sharp edge, is mounted in a frame that is operated vertically by the piston of an air cylinder mounted at the rear of the machine.

The furnace has a capacity of 80 lb. and approximately $1\frac{1}{2}$ hours is required per melt. Melts are run on an average of three days a week, and as many as four heats per day. The cost of re-melting and re-forging the steel does

The small air cylinder shown at left of the operator clamps the hose preparatory to cutting. Downward movement of the air control lever clamps the hose and side shift movement of control lever to the right completes

Fig. 13—Magnaflux testing machine used to test side and main rods for possible cracks or flaws.



SUN "JOB PROVED" PRODUCTS CUT COSTS SPEED PRODUCTION IMPROVE QUALITY

Proof of the value of any industrial product lies in the experience that practical men have had with it. Sun products have been "Job Proved" in the lubrication of almost every type of mining, manufacturing, power and transportation equipment — in refrigeration and air-conditioning; in metal cutting, tempering and quenching; in the processing of textile fibers, leather, natural and synthetic rubbers; in the impregnation of electrical, electronic, and packaging materials.

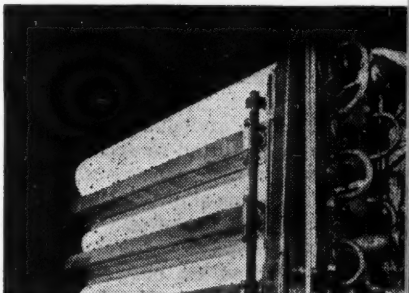
In helping you find solutions to problems in any of these fields, Sun Oil Company offers a wide selection of "Job Proved" petroleum products, plus the experience of Sun Engineers. Detailed product information and the know-how of Sun's engineers are yours for the asking, without obligation. Telephone your local Sun office, or write Dept.MM-1 . . .

SUN OIL COMPANY
Philadelphia 3, Pa.

SUNOCO **SUN**
INDUSTRIAL PRODUCTS

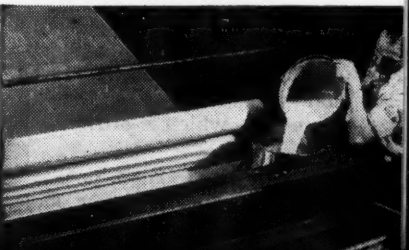


ALUMINUM PARTS MANUFACTURER increased production 43% by using a Sun cutting oil.



PAPER MILL slashed annual lubrication bill \$2874 by using a Sun Grease.

A TEXTILE MILL increased slashing speed 60% by adopting a Sun Processing Oil.



claim-
air-

lb.,
ate-
pur-
steel
s in
are
oxi-
d at
tion
steel
Fig.

by
the
d in
by
o a
me
pis-
the

left
pre-
ve-
mps
of
tes

rws.

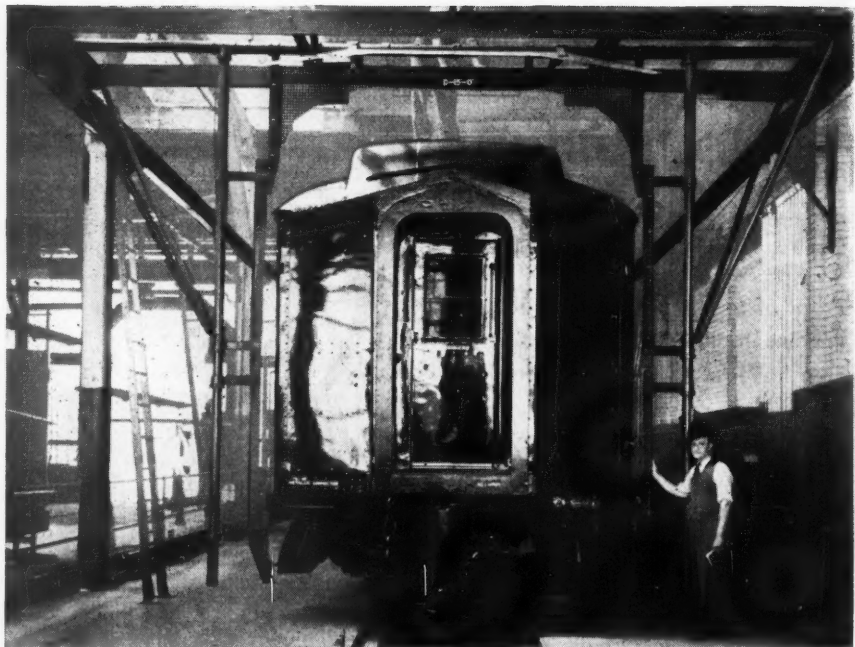


Fig. 14—Rebuilt cars are tested for side and top clearance with the gauges shown here.

the cutting stroke, the hand lever being returned to vertical position leaving the machine set for the succeeding cut.

All side and main rods and driving axles are tested for possible cracks or flaws by the use of the Magnaflux testing machine shown in Fig. 13. The machine is built on the general design of a lathe, so that the workpiece can be chucked at one end for driving while the other end is held in position by means of a bell center. This type of design also provides for pieces of various lengths, inasmuch as the tailstock can be moved back and forth. The bed is made of steel channel sections, electrically welded. The tailstock was reclaimed from a scrapped lathe. A special headstock was built for the use of the chuck, which is of the two-jaw va-

riety which simplifies the task of chucking the end of a side or main rod.

A drainage pan is installed inside of the main frame channels and a small tank complete with a motor-driven pump is located at the tailstock end of the machine. The Magnaflux solution is pumped through a length of hose and onto the work, the surplus solution draining back to the tank for reuse.

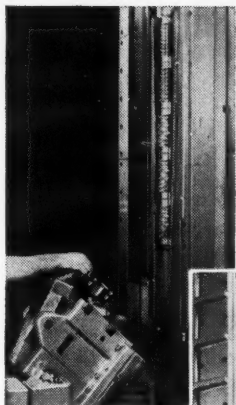
With the workpiece in position, the Magnaflux solution containing fine iron particles is poured or "flowed" over the workpiece while the workpiece is being subjected to electric current. Wherever a flaw exists in the workpiece, however minute, the electric current has the effect of aligning the iron particles parallel to the flaw, making detection simple and easy.

The car shop is not without its spe-

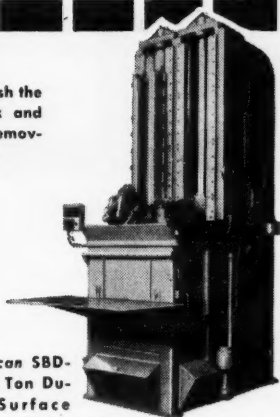
BEARING CAP SETS BROACHED EN BLOC

This *American* Duplex Surface Broaching Machine is tooled up to broach automotive main bearing caps, producing complete sets for 100 motors per hour.

When you are planning metal shaping or finishing work, make use of *American's* complete broaching service—machines, tools, and engineering. You are under no obligation when you SEE *American* FIRST!

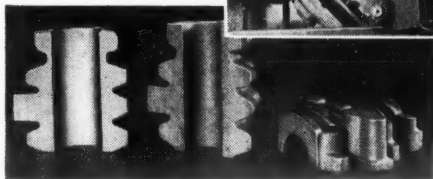
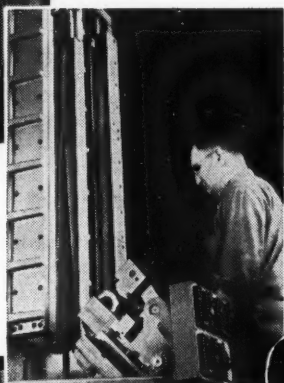


Operation at the left is to finish the joint face and bearing lock and semi-finish the half round, removing $\frac{1}{8}$ stock on each surface.



American SBD-66-25 Ton Duplex Surface Broaching Machine with tilting type work tables.

Operation at right straddle broaches the two ends of the casting.



Above: Right to left: 1. The rough casting. 2. Ends straddle broached. 3. Joint face, bearing lock and half round broached.

FOR ALL YOUR BROACHING NEEDS—

SEE AMERICAN FIRST

American
BROACH AND
MACHINE CO.

ANN ARBOR, MICHIGAN

BROACHING MACHINES
PRESSES
BROACHING TOOLS
SPECIAL MACHINERY



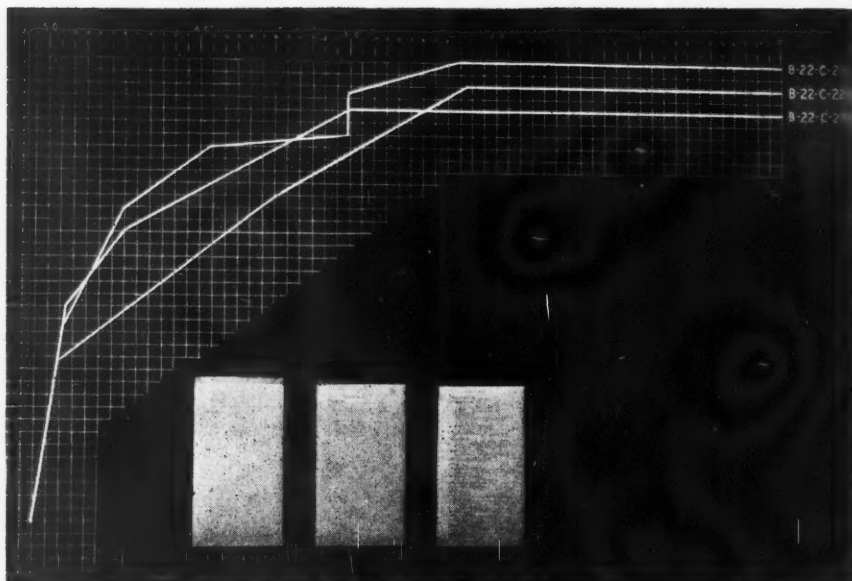


Fig. 15—Chart showing the clearance dimensions for the different types of cars used on Canadian Pacific Lines.

cial tools and gauges. One of these appliances is a gauge for determining car clearances as shown set up for operation in Fig. 14.

The gauge was originally designed to ensure that Canadian Pacific cars would have sufficient clearance for bridges and overhead obstructions on foreign (American) lines. Now, however, all cars are tested as a matter of routine to make sure that they will have sufficient clearance for the C.P. lines.

Three-dimensional gauges are used, one for each side and one for the top of the car as can be seen in the illustration Fig. 14. The gauges are graduated in feet and inches and are so adjusted that all car clearances relative to steps, car height, overwidth of body, and so forth, can readily be checked. A special overhead track with "V" track roller bearing wheels carries the main frame of the track clearance gauge,

which is constructed of extra heavy tubing and securely braced as shown in the illustration.

A pit arrangement five feet deep and suitably lighted permits full inspection of the underbody of the car when clearance gauge tests are being carried out. Making a clearance gauge check-up simply means that the car is placed on the designated track and the clearance gauge is passed over the total length of the car. Under this arrangement, the clearance gauge may be stopped for checking at any desired location.

The chart shown in Fig. 15, which is mounted on the wall adjacent to the clearance gauge, gives the clearance dimensions for the different types of cars used on Canadian Pacific lines.

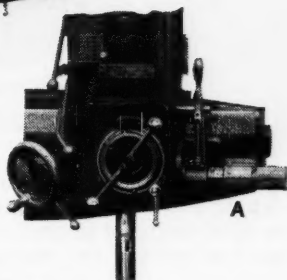
Mention MODERN MACHINE SHOP when writing to advertisers.

SMALL MACHINE...

big Production-



Tapping reverse is optional. With this arrangement the hand wheel is operated by the left hand, while the right hand (grip A) controls advance and return of spindle and automatically controls direction of spindle rotation.



**Equal Efficiency of Every Unit
Makes the Balanced Machine**

Basic features that lower costs in the field of small, high-speed drilling and tapping are found in the 2 1/2' arm simplified design Cincinnati Super Service Radial.

High speeds (to suit your job). Low investment (through simplified design and a completely jugged production setup).

Power saving (one horse power motor), saving in floor space, and speedy operator handling through convenient finger touch controls.

These small machines are accurate and sturdy, and are built to steadily produce at low costs.

Write for Bulletin R-26-A for details of the many new features found in these machines.

THE CINCINNATI BICKFORD TOOL CO. Cincinnati 9, Ohio U.S.A.

Spinning and Panel-Beating of Aluminum Alloys, II

A further discussion of British methods of fabricating aluminum in which the author explains the technique employed in spinning aluminum alloys.

By E. R. YARHAM

IN certain cases, the aluminum spinning process has decided advantages as a means of production, owing to the low costs of the chucks employed, compared with that of the press tools. These advantages are particularly marked in the case of very large or even simple shapes of re-entrant curvature, where, even if large numbers are required, the advantage still remains with spinning. The spinning process is often used in conjunction with the press, initial forming being carried out by pressing and the more complex shaping that follows by spinning. Again, the spinner is often called in to produce experimental shapes calling for a high degree of craftsmanship; by this means a complicated workpiece can be produced speedily and economically. The workpiece can then be tried out, modified if necessary and then passed for bulk production by pressing or other mechanical means, either as a whole or divided into several separate parts to be assembled by welding or other means.

Owing to the ease with which it can be worked, its ductility and its freedom from excessive and harmful work-hardening and season-cracking, aluminum is probably the most commonly spun metal. Aluminum-manganese alloys can be spun with practically the same ease as pure aluminum, but aluminum-silicon alloy hardens much more rapidly and much less work can be done before the metal hardens to the extent of cracking.

Aluminum-clad sheet spins well, though it may require intermediate annealing during the operation. The pure aluminum coating will not rub off under average conditions but may do so if the spinning is very severe.

It is reported that attempts have been made in America to reduce to a concrete figure the factors entering into the adaptability of typical aluminum alloys to the spinning process. Some tentative conclusions are presented in Table III.

The data in Table III are based on the unit 1.0, which is given to the al-

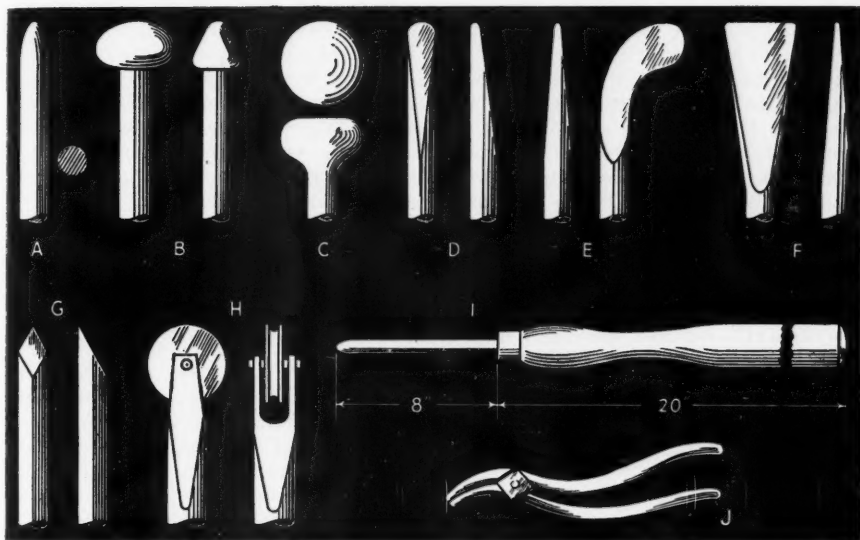


Fig. 3—Hand-spinning Tools. A. Round Nosed; B. Raising-up Tool; C. Knob Raisers; D. Turning-over Tool; E. Groover; F. Planishing Tool; G. Trimming Tool; H. Beading Wheel; I. Dimensions of Average Spinning Tool; J. Spinners' Pliers.

loy which is most readily formed by spinning. The lower the value listed, the higher the cost of spinning that alloy. The figures are based on actual experience, though they will vary somewhat according to the contour of the article to be spun, gauge of sheet, dimensions, and so on. With the heat-treated alloys it is essential that the metal should be in the annealed state and even then only a limited amount of spinning is possible.

Typical examples of articles suited to production by spinning are domestic hollow-ware, radial engine cowlings, and lighting reflectors. Circular spinings may be cut down into a number of bicycle fenders. Air-ducts and similar parts, spun in halves or quarters and afterwards welded are perhaps not so obvious, but are quite practical applications. These indicate the limitations of the process, which can be applied only to such parts that are of

circular cross-section, symmetrically disposed about the longitudinal axis of rotation.

Spinning is carried out on a simple form of lathe, a circular blank of metal, equal in surface area to that of the desired shape, being held by pressure of a disc mounted on the tail-stock against a chuck or tool shaped to the contours of the part to be produced and attached to the face-plate. The disc is rotated rapidly in the lathe and pressure applied so as to deflect the unsupported portion of metal down on to the chuck or former. By this means, with the aid of suitable equipment, almost any desired shape can be produced.

Spinning Lathes. While spinning lathes are generally of simple design, they must be rigidly constructed in order to resist the stresses imposed. Workpieces may range from a few inches in diameter up to as much as 6

feet. As a rule, the spindle is arranged for cone pulley drive providing three or four or more changes of speed, although in some cases direct drive is employed. Where the spindle is carried in plain bearings these should be of ample dimensions. Many modern spinning lathes, however, are equipped with ball or roller bearings. In the tail-stock of spinning lathes, a revolving center is fitted; the usual lathe center is often unsuitable for the heavy work that

extensively used for finishing operations on drawn shells, including smoothing, necking, bulging, trimming and banding. While this work can be done with hand tools, the quantities involved usually justify somewhat more elaborate equipment, which not only lightens the task of the operator but also speeds up production.

On such operations it is customary to employ a lathe having a compound slide - rest with swivel attachment

whereby a roller tool may be traversed over the surface of the shell for smoothing out wrinkles, or modifying its shape, in conjunction with a suitable former. For trimming and beading, a separate lathe may be employed, or a beading and trimming rest operated by hand lever may be substituted for the compound slide. A convenient alternative to the use of the compound lathe is a double

Table III—Relative Spinning Values of Some Aluminum Alloys

| Specification | Shallow Spinning | Deep Spinning |
|-------------------|------------------|---------------|
| B.S. L17 | 1.00 | 100 |
| D.T.D. 213A | 1.00 | 0.995 |
| B.S. L46 | 0.98 | 0.62 |
| D.T.D. 346 | 0.98 | 0.62 |
| B.S. 5L3 | 0.65 | 0.45 |
| D.T.D. 390 | 0.65 | 0.45 |

the tail-stock center must withstand. These revolving centers are fitted with ball bearings, to enable them to run at high speeds, under heavy pressure, without undue heating. Heavy work lathes should be provided with a pressure bearing to take the thrust of the work.

On hand spinning lathes a simple T-rest support is provided which can be adjusted and clamped in any desired position on the ways of the bed. The T-rest proper is adjustable vertically and can also be swivelled in the support. The support surface is hardened and provided with a number of holes for the reception of the peg used as a fulcrum, against which the hand spinning tool is levered. The tail-stock is also adjustable on the bed and provision is made for rapid advance and withdrawal of the barrel, to facilitate speedy insertion and removal of the work.

As already mentioned, spinning is

spinning and beading lathe, equipped with a compound slide at the right-hand end, and a trimming and beading attachment at the left-hand end. The work can thus be divided between two operators.

Spinning Speeds. Owing to the exceptional ductility of aluminum and its alloys much higher spindle speeds are possible than with other metals, although the thicker the stock used the slower must be the speed. It will be obvious, moreover, that workpieces to be spun frequently vary in diameter and consequently in surface speed. In the case of aluminum a peripheral speed of approximately 3,000 ft. per minute is recommended. Table IV gives spindle speeds suitable for various chuck diameters when spinning aluminum.

Chucks. Chucks may be made from aluminum alloys, steel, cast iron or hardwood, depending on the number of parts and quality of finish required.

ra-
th-
nd
ne
lv-
ore
nly
out

ry
nd
ent
be
ace
ng
ng
th
m-
ate
r a
est
ay
m-
ent
he
ole
ed
nt-
d-
en

ex-
nd
ds
ls,
ed
be
to
er
In
al
er
es
us
m-

m
or
er
d.

48



Metal Working Costs can go DOWN, too!

Yes, costs go *down* when you switch to Cimcool. This new kind of cutting fluid—this *chemical emulsion*—actually reduces costs and increases profits three definite ways:

1. LONGER TOOL LIFE (and therefore less down time) because of Cimcool's unique *chemical lubricity*.
2. FASTER SPEEDS are possible because Cimcool cools faster—through a *physical change* in the cutting fluid itself.
3. CIMCOOL COSTS LESS than old-fashioned cutting fluids because it lasts longer. It isn't subject to rancidity. Its low surface tension and non-adhesion to work and chips virtually eliminate carry off.

CIMCOOL DIVISION, THE CINCINNATI MILLING MACHINE CO.,
CINCINNATI 9, OHIO, U. S. A.

CIMCOOL *for* **85%**

Trademark Reg. U. S. Pat. Off.

OF ALL METAL WORKING JOBS

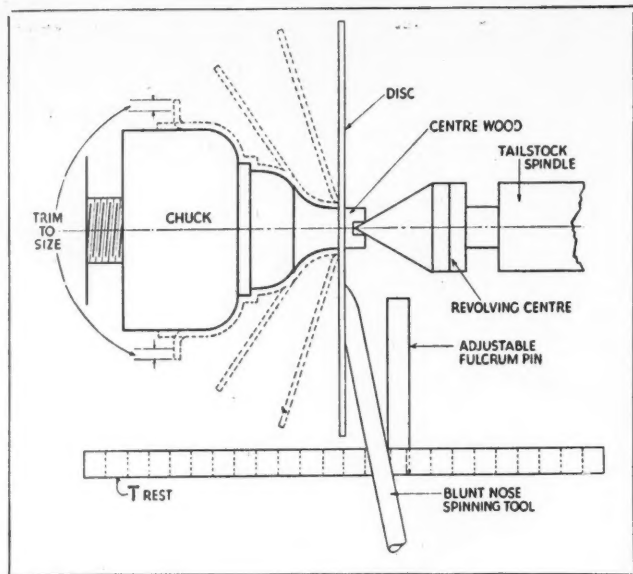


Fig. 4—Diagram Illustrating Actual Stages of Formation in Spinning a Wood Chuck.

For short runs, the chuck or former over which the shell of metal is spun is usually made of wood. The wood chosen must have a close grain and be able to withstand pressure. Lignum vitae gives the longest life but is expensive. Maple is probably the most commonly used, beech and birch, which are also used, have a tendency to compress with the grain and have to be trued.

Wood chucks may be cheaply built in laminations so that the contour may

be readily changed. If the wood chuck shows signs of wear before the number of shells required has been completed, it is often possible to prolong its life by trimming it and spinning a metal shell over it. A groove is cut in the chuck $\frac{1}{2}$ inch deep and $\frac{1}{8}$ inch wide approximately $\frac{1}{4}$ inch above the height reached by the shells being spun. Next, a metal shell is spun over the wood form until the groove has been reached. This shell is then removed and annealed and spun perfectly tight to the chuck. Finally, the edge is trimmed and turned down into the groove provided for it. Metal chucks are naturally used when large numbers of shells are to be spun or when a high-class finish is required on the inside of the spun article. In this case, they should be fin-

'T' SURFACE GRINDER

*Its Simplicity
Insures Its Accuracy*

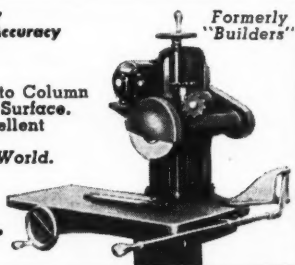
New PRECISION BALL BEARING SPINDLE

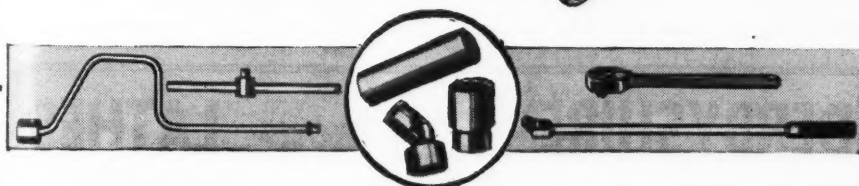
FOR PRECISION GRINDING
Capacity 4" x 8" x 10".
Lever Operated. No Gears
or Racks. Eliminates Backlash.
Bench or Floor Models.

Spindle Pivots Secured to Column
by "3 Point" Bearing Surface.
No Vibration. Excellent
Finish.
Sold All Over the World.

Write for Bulletin

J. B. CROSMAN & SON, East Walpole, Mass.





more and more
in wrenches
the name is

BILLINGS

WRENCHES



Buy them from your Mill
Supply or Hardware Dealer



THE BILLINGS & SPENCER CO., HARTFORD 1, CONNECTICUT, U. S. A.

ished on a lathe and highly polished to ensure that they run perfectly true. A chuck which does not run true is not only a poor tool but also a dangerous one as well.

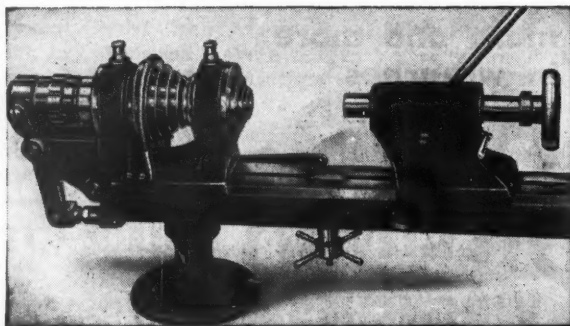
Spinning is a craft, and in the hands of a competent operator articles can be held to close dimensional tolerances. A wide variety of work can be undertaken and considerable ingenuity is required at times in devising a chuck that can be withdrawn when the shape is completed. This is particularly true in the case of workpieces with re-entrant curvatures, but even these are readily achieved with the aid of split or sectional chucks. In making up a sectional chuck it is good practice to plane the sections and fit them together before turning to the desired shape. Pieces of thin paper should be glued to the joint faces before the sections are glued together, in order that the separation of the section may be controlled after turning, otherwise the sections

might be damaged when trying to separate them. Off-center chucks or rolls are a ready means of spinning vase-like shapes. Such chucks only come in contact with the work at the point of spinning, but as they do not have to be assembled and taken apart again they save time. However, spinning cannot be done near the bottom, and the spun product must have an opening large enough for the removal of the entire chuck.

Spinning on air is the most skilled of all spinning operations, since no chucks at all are used, the inside of the shell being supported only by a hardwood wedge held by the operator.

The number of spinning chucks necessary to produce a given shape, or, in other words, the number of preliminary breakdown operations required before the final spin, is dependent upon the shape and size of the finished part in relation to the blank diameter. Shells with perpendicular sides require

DERBYSHIRE *Fine Precision Instrument* LATHES



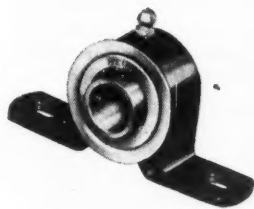
FOR INSTRUMENT AND WATCHMAKING

- THREAD CUTTING
- CENTERING
- TURNING
- GRINDING
- DRILLING
- REAMING
- FORMING
- MILLING

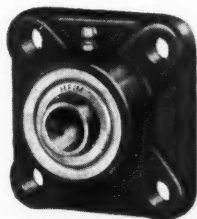
• Illustrated • CAPACITY .315" • BED 12" • SWING 3.94"
MAGNUS BALL-BEARING LATHE • COMBINATION TAILSTOCK
SPRING-BIND COLLET CLOSER ATTACHMENT.

F. W. DERBYSHIRE, INC., WALTHAM 54, MASSACHUSETTS

At Last! A SELF-ALIGNING FLANGED BALL BEARING *by* **HEIM**



Self Aligning Ball Bearing Pillow Block



Flanged Pillow Block — Self Aligning Ball Bearing Type

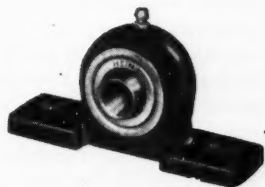
Stock items are illustrated but applications and installation possibilities are unlimited. Here is an inexpensive, self contained ball bearing which aligns itself with the shaft to correct errors in machining or assembly, and which can be mounted simply by pressing it into the hole prepared for it.

Please write for special bulletin on the self aligning bearing

Heim also makes:
Unibal Spherical Bearings
Rod Ends,
Die Polishing Machines
Roller Bearings



Flanged Ball Bearing Self Aligning

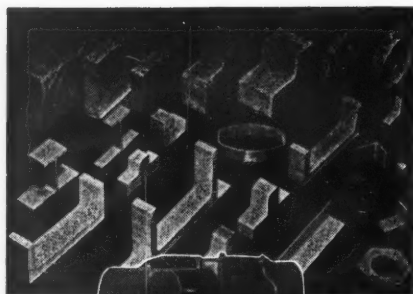


Self Aligning Ball Bearing Pillow Block — Cast Iron Body

THE HEIM
FAIRFIELD



COMPANY
CONNECTICUT



CUTS METAL FASTER *More Accurately*

If you require accurate, high-speed cutting of non-ferrous metals and other materials, here is your machine. Cuts by smooth, fast, milling action. Pneumatic hydraulic feed is coordinated with speed of cutting blade. Vise synchronized with action of ram. No vibration because of weight distribution. Has 4 speed transmission and variable feed mechanism. Built-in coolant system. Properly operated, blade breakage is eliminated. Write or wire for free literature.

CONSOLIDATED MACHINERY & SUPPLY CO., LTD.
2031 SANTA FE AVE., LOS ANGELES, 21, CALIF.

COMET
AUTOMATIC CUT-OFF MACHINE
MODEL MH

more chucks than those with sloping sides.

When the breakdown operations are completed, the "final spin" is given to lay the shell tightly against the chuck, care being taken to see that tightening to the former is progressive from one end to the other, since it is practically impossible to tighten an intermediate section showing looseness. At all stages in the process, the operator usually maintains a flange on the outside of the shell, which is trimmed off after the final spin. Should wrinkles ap-

Table IV.—Spindle Speeds for Chuck Diameters

| Diameter of Chuck (inches) | Speed (r.p.m.) |
|-------------------------------|-------------------|
| 3-6 | 2,000 |
| 7-10 | 1,500 |
| 11-14 | 1,000 |
| 15-20 | 500 |

pear in the flange during spinning, the shell must be taken from the lathe and the wrinkles removed by beating them with a mallet.

The ordinary face-plate may be used to hold the chucks in metal spinning but may be eliminated by using wood chucks bored out and then threaded by means of a thread chaser to correspond in size and pitch to those of the lathe spindle.

Hand Tools. The spinner's craft is one of the few in which the size and dimensions of hand tools are not standardized. Most spinners make their own tools to suit the needs of the work in hand. They fall broadly into three classes; blunt tools, beading tools and tools with cutting edges. The blunt tools are the most numerous in shape and kind. Beading tools consist of a beading wheel holder and a number of wheels of different sizes. The cutting tools include a diamond-point tool or graver, for cutting and trimming, and

HEAT TREAT

SMALL PARTS, TOOLS & DIES

In Your Own Plant

- Install anywhere by simple wire connection. Quiet in operation. No fumes or odors—no ventilating required.
- Any intelligent man can operate furnace with automatic temperature control, using established procedures.
- Operating cost under 4¢ per hour to hold 1600° F. in Model 3 furnaces, with 2¢ per kw.-hr. rate. Others in proportion.

NOW YOU CAN heat treat, harden and temper small parts in your own plant . . . without experienced heat treaters. Economical to install and use, Cooley Electric Furnaces operate efficiently at high or low heats, and save your large furnace time for work requiring large volume capacity. Here are some profitable uses:

PRODUCTION HEAT TREATING of small parts . . . Small batches . . . Running pilot lots to determine mass production techniques . . . Emergency repairs . . . Industrial and laboratory testing . . . Miscellaneous controlled heating jobs.



| CHAMBER | 8" W 6" H 14" L | | | | 10" W 6" H 18" L | | | | 8" W 6" H 14" L | | | |
|-----------|------------------------|--------|--------|--------|------------------------|--------|--------|--------|---------------------|--|--|--|
| FROM COLD | 1850° F. in 55-65 min. | | | | 1850° F. in 55-65 min. | | | | 2000° F. in 2½ hrs. | | | |
| AMPERES | 14.8 at 230 v. | | | | 19.6 at 230 v. | | | | 20.2 at 230 v. | | | |
| WATTS | 3400 | | | | 4500 | | | | 4650 | | | |
| MODEL* | MH-3 | VH-3 | MK-3 | VK-3 | MH-4 | VH-4 | MK-4 | VK-4 | VK-5 | | | |
| PRICE | 160.00 | 185.00 | 200.00 | 225.00 | 245.00 | 270.00 | 285.00 | 310.00 | 340.00 | | | |

* M models complete with hinged door and hearth plate.

V models have counterweighted vertical lift door.

K models include Selective Power Modifier for input control to correct temperature lag.

ACCESSORY EQUIPMENT

Electronic operated Veri-tron indicating and controlling pyrometer, with thermocouple and lead wire . . . \$143.00
Same in self-contained, enclosed panel including line switch and fuses, with steel stand—completely wired . . . 250.00
Steel stand with shelf . . . 35.00

DEALERS AND DISTRIBUTORS WANTED!

Good territories open on this extensive line of self-contained small electric furnaces. Investigate now.

FORCED CIRCULATION AIR DRAW FURNACES — Write for data.

FREE LITERATURE

NEW CATALOG completely describes all models and applications for each. Write today for your copy . . . no obligation.



COOLEY ELECTRIC MANUFACTURING CORP.

34 South Shelby Street Indianapolis 7, Indiana

INDIANAPOLIS MACHINERY EXPORT CORP.

Export Manager: 44 Whitehall Street, New York, New York

one or more pairs of specially-shaped pliers, used to pull over the edge of the metal when forming a lap.

The tools used are of steel and consist essentially of shaping and planishing tools. The first gives the shape required with, in some cases, owing to the edge of the tool, a certain amount of ridging, which is finally removed by planishing with a special fishtail tool, when a surface almost as good as the original blank can be obtained. Figure 3 shows various hand spinning tools.

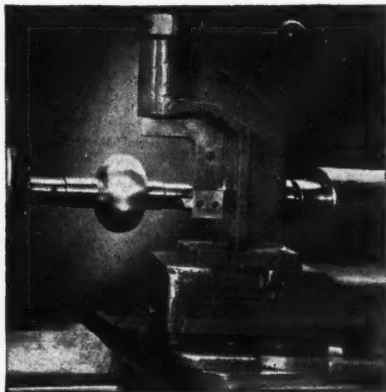
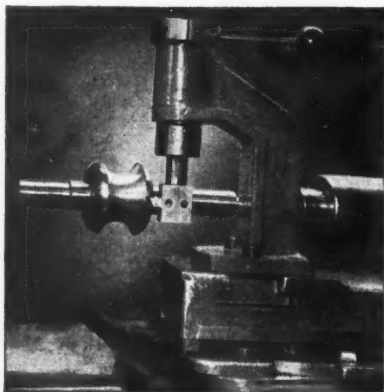
Blanks. If required, the blanks or discs are supplied cut to size by the producer. At times it may be necessary to cut discs from the metal sheet or strip by means of circular shears. The circular shear may even be provided with a punch for punching out the center hole in the disc, should such a hole be desirable.

In regard to blank size, the general rule is to take the area of the finished

article as being equal to that of the blank, but in the case of complicated shapes this gives an oversize figure since, during spinning, the parts are reduced in thickness, thus giving an equivalent increase in area and causing waste of metal in the final trimming. Another rule used is that the diameter of the blank should be equal to the largest diameter of the finished part plus its height.

It is never easy at first to estimate whether a certain job can be spun in one operation, that is, completed on only one chuck. A good rule to observe is that a height of one third of the diameter of the finished shell may safely be spun in one operation. The skilled craftsman, however, will sometimes exceed this.

It should be noted that tapering shells of light-gauge aluminum can often be spun successfully two or even three at a time on the preliminary



CONCAVE-CONVEX TURNING TOOL

No. 1—Tool made for 9" to 14" Lathes.

Price Complete.....\$ 52.00

No. 2—Tool made for 16" to 36" Lathes.

Price Complete.....\$128.00

When ordering, state "T" slot dimensions—also distance from center line of spindle to top of compound rest. All steel parts case hardened.

J. E. FREYMAN & SONS

Write today for full particulars.

3627 KESWICK ROAD, BALTIMORE 11, MD.

f the
cated
figure
s are
g an
caus-
trim-
t the
equal
ished

mate
un in
n on-
serve
e di-
safely
illed
s ex-

ering
un of-
even
nary

TEAMWORK FOR PROFIT

Courtesy of Fairbanks, Morse & Co

Quality Tools produce a Quality Product

Fairbanks, Morse & Co., one of the world's leading manufacturers of Electrical Equipment and Diesel Engines, uses scores of "American" Hole Wizard Radial Drills to produce quality at a profit.

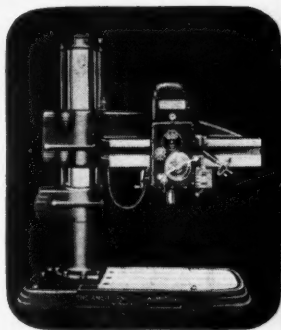
The smooth operation and easy handling of "American" Radials give them front rank recognition amongst users as dependable producers of accurate and finely finished work.

The directly connected, head mounted motor guarantees maximum power at the spindle.

Finger-tip and direct-reading controls insure speedy manipulation for greater work production.

Anti-friction mounting of head on arm and convenient location of all operating levers mean less operator fatigue and more work at day's end.

For quality work at a profit your best bet is "AMERICAN".



THE AMERICAN TOOL WORKS CO.
Cincinnati, Ohio, U. S. A.

Lathes and Radial Drills

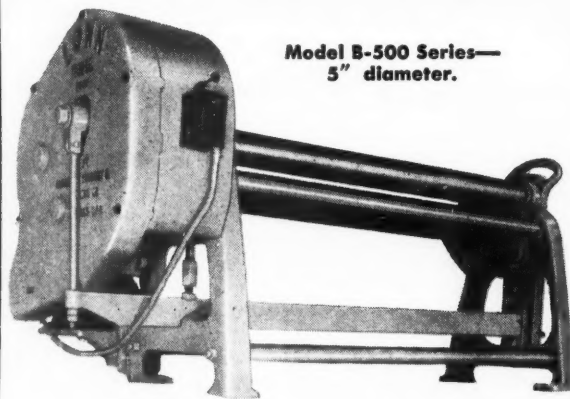
breaking-down chuck. On the final chuck, of course, only one at a time should be spun.

Spinning Technique. The actual stages in spinning are best illustrated by diagram Figure 4. The blank is placed in the lathe against the bottom face of the chuck and the tail-stock is brought to bear lightly on it. The blank is centered while the chuck is revolved slowly by hand; the tail-stock is then screwed up tightly against it. The speed should be determined by reference to Table IV. The blank is first lubricated as it revolves in the lathe. The toolrest should be adjusted so that the working surface of the spinning tool will reach slightly below the center line of the lathe. The handle of the tool is held under the operator's armpit. For a tall operator, the toolrest is naturally higher than for a short operator.

With the lathe running at the desired speed, the spinning tool is held

against the blank at the point of contact with the tail-stock. As the blank revolves the metal is forced against the face of the chuck by levering the tool on its fulcrum, a pin on the tool-rest. Too much leverage should not be attempted at one time, as it may cause the metal to wrinkle. In some cases the disc is supported on the inner edge by an additional tool, the back-stick, usually a piece of hardwood, the function of which is to steady the blank as it is being pushed on to the chuck. It may be necessary to move the pin in the tool-rest as spinning progresses.

When a change is made in the location of the pin, the spinner should, theoretically, continue from the point where he left off and spin forward again until the disc assumes the shape of the chuck. This outward movement tends to thin the metal, so in actual practice the process is reversed and the spinner works from the outer to the inner edge, which has the effect of restoring the



**Model B-500 Series—
5" diameter.**

LOWN

SLIP ROLL FORMING MACHINES

**Meet Job Requirements
for Peak Production**

Our machines are fast, efficient, sturdy, and easy to operate. They are built in a range of sizes from which you can choose the exact unit required.

Write for bulletins.

SAN ANGELO FOUNDRY & MACHINE COMPANY

SAN ANGELO, TEXAS

E. UPTON AND SFE TRACKS

Distributors in Most Principal Cities

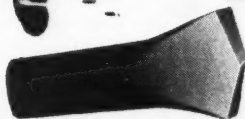
con-
lank
ainst
y the
tool-
not
may
some
inner
ack-
l, the
lank
nuck.
in in
es.
loca-
the-
point
again
of the
tends
actice
inner
edge,
g the



IT WAS A STEP FORWARD

When grampa changed from the

Old Flat Drill



to the

Modern Twist Drill



IT WILL BE ANOTHER STEP FORWARD

When YOU change from the

Old Hook Type Boring Tool



to the

Modern Precision Boring Tool



WITH the old type of tool the clearance is usually ground by hand; even an experienced operator finds it difficult to control the clearance angles.

With the Precision Bokum Boring Tool the proper clearance is built into the tool. All resharpenering is done from the top surface only, in this respect the tool is like a form tool wrapped around a shank, the curvature being such that the clearance angle remains constant throughout the life of the tool. As with any form tool the life of the Bokum Boring Tool is many times that of an ordinary tool.

Available: Wide range of sizes for boring holes from $\frac{3}{32}$ " dia. up . . .
in super high speed steel and Carbide Tipped.

Ask for catalog B1139 for super high speed tools
and for B398 for carbide-tipped.

For general boring, use Style A

For facing and bottoming, use Style B

For internal threading, use Style C



TRADE MARK REG. U. S. PAT. OFF.

BOKUM TOOL CO.

14775 WILDEMERE AVE. • DETROIT 21, MICH.

SINGLE POINT BORING TOOLS—INTERNAL THREADING, BOTTOMING AND FACING TOOLS—CARBIDE TIPPED TOOLS

Add this Time Saver to Your Equipment—



"HARDSTEEL" DRILL

● When last minute changes come through on hardened parts and dies—drill without annealing using "HARDSTEEL" drills—and save time.

When parts must positively match at assembly—harden first, then drill with "HARDSTEEL" drills—and save time.

When case hardened steels must be drilled, use "HARDSTEEL" drills to get through the case—and save time.

Yes, "HARDSTEEL" drills, made of special material and to a special design eliminate all annealing and the distortion usually caused by rehardening. They work on steels hardened by any process to 40 Rockwell "C" or harder.

The "HARDSTEEL" Operators Manual will give you many tips on how this well known tool can save time and material in your plant. Copy free on request.

**You Harden It — We'll Drill It —
with "HARDSTEEL"**

**"HARDSTEEL" Tool bits make
faster, deeper cuts on steels
and non-ferrous alloys.**

BLACK DRILL CO., Division Black Industries
1390 East 222nd Street • Cleveland 17, Ohio

"HARDSTEEL"

DRILLS • TOOL BITS • SPECIALS

natural thickness of the metal. With the blank spun down onto the chuck, some ridging may be apparent as spinning has been done with a round-nosed tool. Ridging may also result from working the tool too fast over the shell, so a light run over the whole shell is now given with a flat-faced tool or planisher to obtain a perfectly smooth surface. After smoothing, the edge should be turned back slightly and trimmed off with a diamond-shaped cutting tool. The cut-off tool should be held slightly below the center line of the lathe—never above it. Neglect of this precaution may cause serious damage to the work and possibly to the operator.

In estimating for the production of a part by spinning, the designer must realize that although the spinner has a certain amount of control over the final thickness of his work, some metal is lost in shaping by this process. For example, if a complicated shape is to be produced, the metal will thin down appreciably towards the edges of the spinning and also during planishing. This reduction in thickness may amount to one or more gauges, and it is therefore essential in some instances to start with a blank which is thicker by several gauges than the finished article. Flat surfaces on which little work has been done can be reduced to a comparable thickness by a final planishing operation.

The amount of pressure required can only be acquired by experience. Incorrect distribution of pressure over the area spun will lead to a spinning of varying thickness, while holding the tool too long in one spot hardens some alloys excessively, making annealing necessary. Too much pressure will cause the metal to wrinkle at the edges and vibrate. An even distribution of pressure is likewise incorrect practice since, during the spinning operation, owing to the greater friction as compared with the smaller diameter, the

Quick Delivery **on Cast Bronze Bearings**



Any type...any size...any quantity

Write, wire or call. No order too large to tax our facilities . . . none too small to warrant careful attention. Highest quality, precision finish, lowest cost. Get in touch with us **TODAY**.

JOHNSON

SLEEVE BEARING

590 S. MILL STREET



BRONZE

HEADQUARTERS

NEW CASTLE, PA.

edge of the disc hardens more rapidly and thus demands greater pressure. As has been stated above, spinning is properly a craft, and it is not easy, if indeed possible, to record the skill that a spinner of long experience has intuitively in his fingers. Nevertheless, an experienced spinner will know the pressure required for a particular spinning and will be able to produce within fine limits a spinning that is of even thickness.

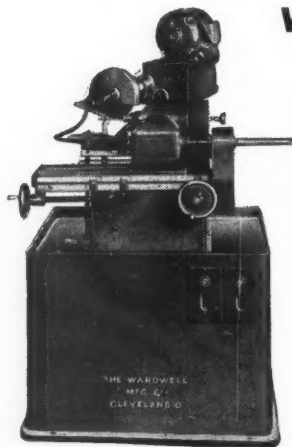
When a disc does not permit the use of a center hole, a tail-block of the same size as the base of the finished job must be placed over the $\frac{3}{8}$ -inch end of the friction unit. The disc is placed between the tail-block and the chuck and must be centered carefully; otherwise, when the lathe is started, the revolving disc may be thrown out with serious consequences to the operator. It must be remembered that it is pressure alone, in this type of set-up, which holds the disc in position. Only

sufficient pressure to hold the disc in place should be used, since excessive pressure from the tail-stock causes serious wear on bearings of the lathe. The insertion of discs should always be done when the lathe is standing still and the chuck at rest. Failure to observe this rule is the major cause of accidents during spinning operations. When spinning articles that require tail-blocks, it is a good rule never to stand in front of a revolving disc when first starting the lathe, since oil or grease may cause the disc to fly out.

Where the shape is unusually large or the thickness of the metal greater than 14 s.w.g., spinning is generally carried out by semi-mechanical or entirely mechanical methods. Semi-mechanical spinning differs from spinning by hand principally in the application of the tool to the work. Two hand-operated feed screws are used to control the motion of the tool, the left-hand feed moving the tool as it fol-

Carbide Drills Fluted

Wardwell 90 F.S. Fluting Grinder
... indexes automatically



**Wardwell 90 F.S.
Fluting Grinder**

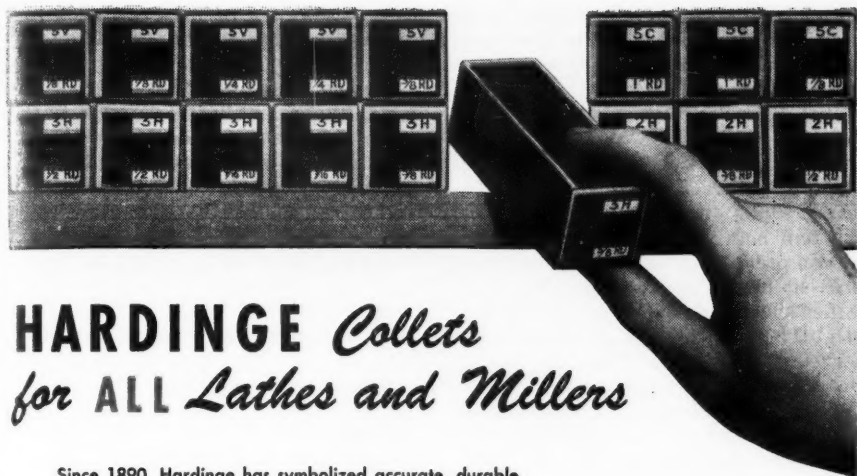
Grinds from solid

Grinds and sharpens taps, drills, reamers, milling cutters, end mills and saws $1/16$ " to 12" diameter. Grinding angles up to 45°. Spiral leads as short as $5/16$ " to one turn can be obtained. Sharpens saws in gangs up to $7\frac{3}{4}$ " long. Write for Bulletin 90 F.S.

THE WARDWELL MFG. CO.

3166 FULTON ROAD

CLEVELAND 9, OHIO



HARDINGE *Collets* for ALL Lathes and Millers

Since 1890, Hardinge has symbolized accurate, durable, and low priced collets for all types and sizes of machines.

Specify Hardinge collets and you will obtain maximum production efficiency in addition to these extra services:

ONE SOURCE OF SUPPLY

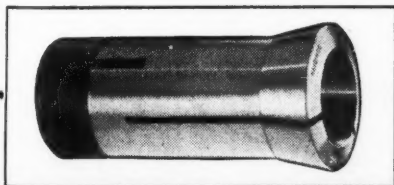
You can standardize on Hardinge Collets and have a complete selection for all makes of lathes.

PROMPT DELIVERY FROM STOCK

Collet stocks are constantly maintained in ten convenient locations throughout the United States: West Hartford; New York City; Elmira; Rochester; Cleveland; Detroit; Chicago; Minneapolis; Los Angeles; and San Francisco. No production hold-ups for Hardinge collets.

SIMPLIFIED ORDERING

Purchasing and Engineering Departments welcome the Hardinge Reference List which simplifies ordering because there is a Hardinge collet for every make of machine.



Take advantage of Hardinge complete collet facilities. Write today for Bulletin 47 which includes the special reference list and describes and prices Collets for all Lathes and Millers.

HARDINGE BROTHERS, INC., ELMIRA, N. Y.

"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

lows the contour of the chuck while the right-hand feed controls the longitudinal movement of the work. This method demands less effort on the part of the operator than does hand spinning but requires considerable skill. In the fully mechanical method the tool is made to travel backwards and forwards along the length of the shape, the tool being advanced step by step by compressed air as the work is being pressed firmly against the chuck. In lathes used for this type of spinning brightly polished steel shoes or forms serve as the tool and are applied to the work by hydraulic pressure.

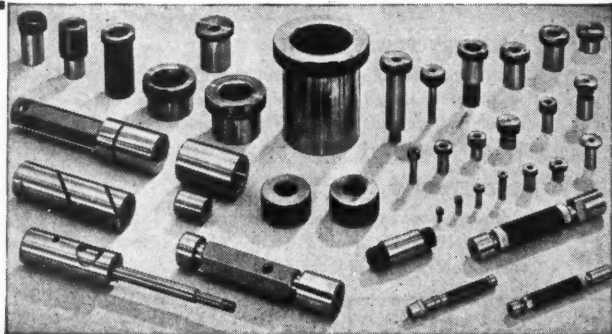
Gauge of Material. Since spinning generally involves some reduction in the thickness of the material, an allowance of approximately 30 per cent greater than the thinnest permissible section of the spun part should be provided, although this factor varies with the gauge and type of sheet, the shape of the part, and the skill of the oper-

ator. The gauge of material used for any particular part is controlled by the material and the depth of the spinning. As a general rule, sheet to D.T.D. 213A can be spun in sheets as thin as 26 s.w.g. for parts up to 2½-inch deep, 22 s.w.g. for parts from 2½-inch to 4-inch deep and 16 s.w.g. for parts from 8-inch to 12-inch deep. Aluminum-clad sheet to D.T.D. 390 requires a minimum gauge of 20 s.w.g. for parts up to 2½-inch deep, 18 s.w.g. for parts from 2½-inch to 4-inch deep and 16 s.w.g. for parts from 4-inch to 8-inch deep.

Deeper parts requiring thicker material should not be spun in aluminum-clad sheet.

Annealing. During spinning operations the workman can feel the metal "flow" beneath the tool. If the metal becomes work-hardened and the properties of the "flow" impaired, temporary restoration of workability may be obtained by heating the partially form-

E
C
O
N
O
M
Y



P
R
E
C
I
S
I
O
N

Drill Jig Bushings and Gages

A.S.A. STANDARD types and sizes in stock for immediate delivery. Excellent delivery on NEW GAGES and GAGES salvaged by HARD CHROMIUM PLATING.

WRITE TODAY FOR LITERATURE & PRICE LISTS.

ECONOMY TOOL & MACHINE CO.

1829 S. 69TH STREET

MILWAUKEE 14, WIS.

Speed-wet^{*} Discs Cut Faster...Longer



because
they're

3 ways better

"30% Faster" . . . "production 4 to 1 better" . . . "lasts 5 times longer" . . . never before have so many people expressed so much praise for any disc we ever made.

Technically, the secret of the extra cutting speed and long life of Speed-Wet Discs lies in the balanced combination of three quality features: heat-set resin bonding for resistance to heat; all-fibre backing for extreme flexural strength; and all-Durabonded[®] coating for rugged grit anchorage.

An on-the-job test in your own plant will prove to you the increased production performance of Speed-Wet Discs. We'll be glad to arrange it at your convenience—just write us on your company letterhead.

* Reg. U. S. Pat. Off.

watch for
SERVICE
PACKAGING

BEHR-MANNING

(DIVISION OF NORTON COMPANY)

TROY, N. Y.

- All Resin Bonding
- All Fibre Backing
- All Durabonded Coating



ed blank with a torch while it is rotating in the lathe. Complete annealing, of course, cannot be carried out in this manner, and, should it become necessary, the blank must be removed from the lathe and heated quickly either by a torch or in a salt-bath to the appropriate annealing temperature. Heating by torch is a useful means of dealing with large shells, the correct temperature being gauged by rubbing from time to time a piece of pinewood on the surface until it just leaves a brown char mark. In all cases, a fast method of heating should be used to prevent grain growth. Immersion in a molten nitrate bath or air furnace at 340 deg. C. to 420 deg. C. is satisfactory for small articles. The time of heating varies from 30 seconds to several minutes, depending on the metal thickness. The number of annealing operations required is a variable factor controlled by the size and shape of the

work and the rate of strain-hardening of the alloy being spun.

The annealing of aluminum-clad alloy spinings is inclined to be rather more critical than that of uncoated material. One British works, specializing in the spinning of sheet to D.T.D. 390, anneals at from 380 deg. C. to 400 deg. C. after which the parts are placed in a tempering oil at 230 deg. C. to 260 deg. C. for 20 minutes, the oil being washed off in paraffin. The heating in oil is said to give a considerably better surface finish and softer material, factors particularly important where the spin is severe.

Lubrication. Adequate lubrication is essential owing to the friction between the head of the spinning tool and the disc being spun. To reduce the heat and prevent damage to the material and tools the blank must be coated with a lubricant. For small work, beeswax, tallow and lard oil mixed with white

Dealers Being Appointed

THE NEW

ALPHA

TRY-OUT PRESS



For the first time a production-type press for die tryout. Bolster and head tilt for die finishing. Return to original position.

**TRIES DIES UNDER
ACTUAL PRODUCTION
CONDITIONS**

**PERMITS FINISHING
DIES WITHOUT
REMOVING THEM
FROM THE MACHINE!**

WRITE FOR DETAILS

ALPHA TOOL WORKS
9281 Freeland Avenue
Detroit 27, Michigan



ning
al-
ther
ated
cial-
T.D.
to
are
g. C.
e oil
The
nsid-
fter
por-
on is
ween
d the
heat
a and
with a
wax,
white

Subject FILES FOR BRASS

**"KNOW
YOUR FILES
AND CUT COSTS"**

• The use of the right file
saves materials, workmen's
time, and improves results.
Save these advertisements.

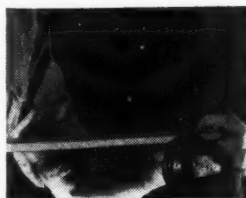
Prepared by Nicholson File Co.



BRASS FILE



FLAT BASTARD FILE



FILING BRASS

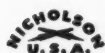
WHY BRASS REQUIRES A SPECIAL FILE

Although brass is the softer metal, it is more malleable than steel, and also very ductile and tough. Brasses differ in composition and in their characteristics; and where regular-purpose files do not meet all requirements, files having extra sharpness or special tooth construction are required for the very best results.

THE DIFFERENCE Compare a Nicholson or Black Diamond Brass File with a regular Flat Bastard File. The Brass File has a long overcut angle and a short upcut angle. The short upcut angle prevents the file from running off the work, while the long overcut, producing many *tooth points* on the short upcut, *of the proper shape* to break up the filings, allows the file to clear itself of chips.

CORRECT USE OF BRASS FILE The Brass File requires a little more pressure on the heel than on the point; and a slight motion to the right and left on alternate push strokes contributes to better filing and smooth finish. Available through your industrial distributor in Flat and Half Round shapes and in 8", 10" and 12" lengths.

• *Nicholson makes special-purpose files for Brass, Lead, Aluminum, Stainless Steel, Foundry Castings, Die Castings, Die Making, Lathe Filing, Curved and Shear Tooth Filing — and Swiss Pattern Files of all shapes and sizes. FREE BOOK—"FILE PHILOSOPHY."*



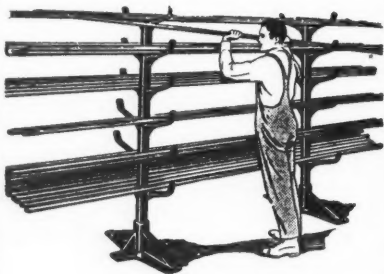
NICHOLSON FILE COMPANY
48 Acorn St., Providence 1, R. I.
(In Canada, Port Hope, Ont.)



NICHOLSON FILES FOR EVERY PURPOSE



Each BROWN SECTIONAL RACK combines five major and several minor features of design, all of which save money for its owner. The time previously lost in end-hauling each bar of stock its entire length from the old-style, closed-side Rack is saved by the Brown Rack which requires but a few inches of side movement.



Each length, width and thickness of stock is displayed in Gold-Fish visibility for instant selection and workmen waiting for stock are served without waste of time. The BROWN SECTIONAL RACK is a simple, durable article built in five styles from standard inter-locking metal sections. It cannot burn, sag or twist; unattached to the building, it can be moved at will. Changes in length of stock can be met by moving the units nearer or further apart, while increases of stock can be met by simply adding more standard units. Built from metal thruout, depreciation is practically nil. SEND FOR BULLETIN 26-M.

BROWN SECTIONAL RACK

BROWN ENGINEERING CO.

120 N. THIRD ST. READING, PA.

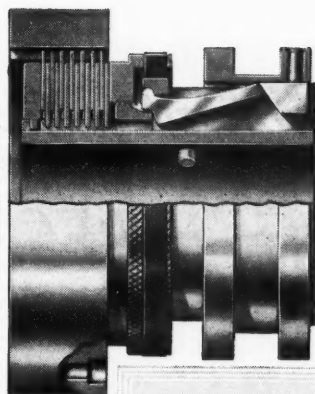
RACKS • VISES • CLUTCHES • COUPLINGS

lead or vaseline may be used. These lubricants, however, are not satisfactory when spinning large-diameter blanks which require heavy pressure, since the forming tool cuts through and harms the metal. In such cases ordinary laundry or yellow soap may be recommended, although soap containing much alkali should be avoided as these will damage the surface of the metal. A convenient way of applying lubricant is by means of a tight roll of cloth saturated with the lubricant chosen; when tallow is used in the form of candles, these may be applied direct to the surface of the blank.

Development of Spinning. The recent war saw an increased use made of the speed of production obtainable by spinning. In Britain metal spinners were often asked to take over the first 10,000 or 20,000 of a long run job while press tools were being prepared for the ultimate bulk production of the work-piece. In fact, it may be said that spinning is a necessary auxiliary to pressing. Limits that were thought impossible before the war are now conformed to almost as a matter of course.

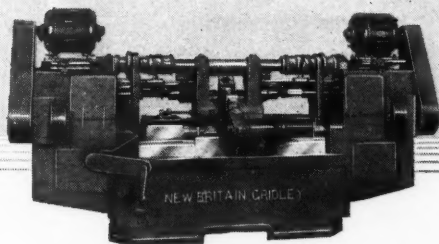
The third section of this article will appear in the February issue of MODERN MACHINE SHOP.

"How to Plan Your Toolroom Heat Treating Department" is the title of a 24-page booklet prepared by the Lindberg Engineering Co., 2444 W. Hubbard St., Chicago 12, Ill. A practical discussion prepared to assist those planning new, enlarged, or changed toolroom heat treating departments, the booklet tells how much a complete toolroom heat treating department will cost and how to select furnaces of the proper size; contains pictures of recommended layouts; presents approximate floor space requirements, and lists prices of auxiliary equipment such as tongs, quench tanks, straightening presses, workbenches, hardness testers, and so on. Special "template" pages of furnaces, quench tanks, and so on are included which can be easily cut out in order to present a visual picture of how a contemplated toolroom setup would look. Copy of the booklet is available free to mechanical executives upon request.



MAXITORQ

keeps Good Company



THE MAXITORQ Floating Disc Clutch was designed to solve certain power transmission problems, especially those formerly encountered in automatic machine tool operation. As evidence that MAXITORQ design has proven successful we show the new Double End Tool Rotating Chucking Machine, manufactured by New Britain-Gridley Machine Division.

Normally two single clutches are used in this

model... one to control feed motions, the other for control of the rapid transverse. When threading is done, at either or both ends of the machine, one double clutch serves each spindle.

May we suggest that Designers and Manufacturers of machine tools, and other machinery, ask for our detailed bulletin. It contains information you need... about the clutch you can use... profitably.

Send for Catalog No. MM1



THE CARLYLE JOHNSON MACHINE COMPANY
MANCHESTER • CONNECTICUT



COMPLETELY *Automatic*
PRESSING • FEEDING • EJECTING *
with **MULTIPRESS**
AND INDEX TABLE ACCESSORY

◇ Press ram and table dial operate in positive sequence. Both are operated *HydroILlically* through the control system of the MULTIPRESS.

◇ Single lever controls action of both ram and table for either single or automatic cycling.

◇ Tooling may be located at six stations around the dial.

◇ Cam within table housing provides automatic ejection of the finished parts (optional).

◇ Ram speed, tonnage, and rate of travel, as well as movement of the table dial, are easily regulated by the operator.

● Here's your answer to increased production—lower manufacturing costs—improvement of plant working conditions. The MULTIPRESS with the *HydroILlic* Index Table gives you *completely automatic* operation for countless applications, yet permits the use of unskilled workers on jobs formerly requiring experienced operators.

There's a complete file of case histories, proving the outstanding results all industries have experienced after using MULTIPRESS. Write for the complete story, today, and also ask for Bulletin M-9.

The *HydroILlic* Index Table is also available as a separate unit for use on any hydraulically powered machinery. Write for details.

THE DENISON ENGINEERING CO.
1153 Dublin Rd., Columbus 16, Ohio

U. S. PAT. OFF.



DENISON
EQUIPMENT & APPLIED
HydroILlics

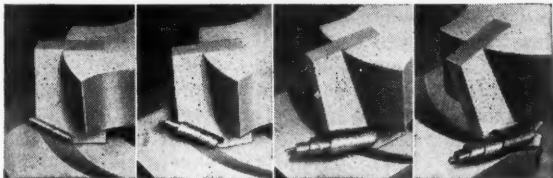
INGERSOLL BUILDS

World's Largest MILLING CUTTER



● We hope you saw this 91" diameter 9 ton Ingersoll Shear Clear Face Mill in Chicago at the Machine Tool Show because it is indicative of Ingersoll's wide range of experience designing and building inserted blade milling and boring tools. Ingersoll makes tools that vary from the size of your thumbnail to the mammoth Shear Clear Face Mill pictured.

● The engineering skill exhibited in this large cutter is also available to you. We ask for the opportunity to discuss the application of Ingersoll inserted blade tools to your milling and boring operations. Cutters are available with High Speed Steel, Cast Alloy, or Carbide Tipped blades to suit your particular conditions.



● Illustration above shows chip formation with Ingersoll patented Shear Clear Face Mill. Available with High Speed Steel, Cast Alloy, or Carbide Tipped blades, and with angles suitable for cast iron, steel, or aluminum. Did you see the Carbide Tipped Shear Clear milling die block steel at Ingersoll booth in Chicago?



Write for Catalog 56(A) giving the complete details of Ingersoll Inserted Blade milling and boring tools.

A Planned Handling System Saves Time and Space at Morse Chain

By R. O. ERICKSON,

Material Handling Supervisor

Morse Chain Co., Division of Borg-Warner Corporation

RECENT revisions in the materials handling system, many of them in the postwar reconversion period, have speeded handling, added space, and cut costs at the Morse Chain Company, Ithaca, New York, manufacturers of roller, power, and automotive chain.

The time required to hoist a certain quantity of sheet steel to a manufacturing department located on an upper floor was cut from about 8 hours to 1 hour. By making use of tiering pallets and skids, available storage space was increased three times and by utilizing fork trucks to handle and transport coiled steel strip and finished chain, thousands of dollars were saved.

Receiving operations were facilitated by an electric hoist and special pickup element. Shipping operations were improved by installing a scale as an integral part of the shipping room roller conveyor. Waste handling, loading and unloading elevators, transporting sprockets, and other miscellaneous handling operations were studied and assigned to the new fleet of fork trucks.

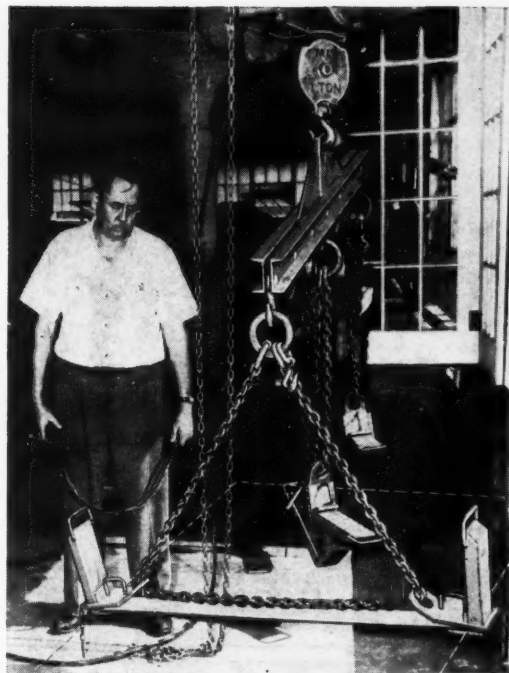
At the Morse Chain Company plant sheet steel is hoisted to a third floor

sheet-metal department by means of a 1-ton electric hoist which travels on a beam extending out over the plant yard. A long control cable attached to the hoisting mechanism permits the operator to control the raising and lowering of the load by push-button control when the hoist is at the far end of the beam.

An interesting handling tool for picking up the sheets is shown in Fig. 1. Previously, a chain was wrapped around the stacked sheets and the hoist hook attached to the chain. This caused the ends of the stack to droop when lifted, and deformed the steel as well as made it difficult to handle. The new yoke-like hook attachment is equipped with three pairs of grips which grasp the sheets in three locations along each side of the stack and thereby hold the sheets rigid during the hoisting operation. The grips which engage the sheets are adjustable so as to permit handling of various size stacks of sheets. The hoist installation has made it possible to do a job in one hour which previously took eight.

Strip steel from which parts for roller, silent, and automobile chain are punched, is pickled and then rolled to

Fig. 1—Hoist equipped with special pickup attachment for sheet steel. Dotted line indicates position of steel sheet.



the desired thickness in the Morse Chain plant. The strip sheet is rolled in 1-inch, 2-inch and 3-inch widths and in various thicknesses for various gages of chain.

As the steel strip leaves the finishing rolls it is coiled, bound, and placed on pallets. Small coils, about 2 feet in diameter are stacked about 25 deep on small-size pallets 28 inches x 26 inches x 4 inches in size. Larger coils, about 4 feet in diameter, are stacked about 15 deep on standard-size pallets. After the coils have been stacked, they are weighed. Loads weighing up to 2400 lb. are then transported, as shown in Fig. 2, either to the press room or to temporary storage.

One Yale Worksaver tilting - fork truck and two Yale center control tilting-fork trucks are used in the handling operation. The former is especially valuable in tight places. It is handle-guided from the floor and is propelled by an electric motor controlled from the handle. The latter type, in addition to lifting and tiering features, can save time in transporting goods to and from distant points in the plant. The tilting fork feature of both trucks nestles the load at an angle and prevents spilling when going downgrade, turning corners, or stopping suddenly. An innovation used at Morse Chain is the placing of channel angles over the forks in order to extend their length when lifting large loads.

Formerly, coils of steel were loaded onto skids by hand, but now the larger coils are tiered onto pallets by forks. Hand trucks were formerly used to transport the coils to the press batteries. The savings effected by the use of fork trucks in the handling and transportation operations amount to thousands of dollars per year.

Storage

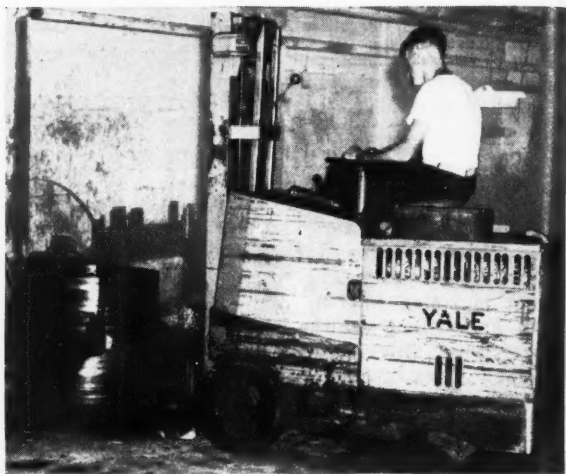
The greatest improvement in the handling system was made in the efficient use of space for coiled strip and assembled chain. Previously, both strip and chain were handled on metal skids. However, as the inventory was built up in temporary storage areas, the square footage was used up. This condition resulted in congested areas, overflow of skids into aisles and work

Fig. 2—Center control tilting-fork truck on which coiled stock is transported to battery of presses.

areas, and an uncoordinated flow of materials to and from the storage zone.

The new handling system, in addition to making use of the fork trucks and pallets already mentioned, includes a specially-designed skid bin. The advantage of the fork truck, pallet, and skid bin system is that now pallets and skid bins can be tiered, thereby making a storage space out of a storage area. The final inspection area

for assembled chain, as shown in Fig. 3, is roughly 60 feet x 24 feet, and by tiering the pallets by means of the fork truck, this storage space was also



SAVE HANDS WITH STRANDS

**Safeguards
For Punch
Presses**

**Send for Enclosure
and
Sweep Safeguard
Circulars.**

STRAND MFG. CO., INC.

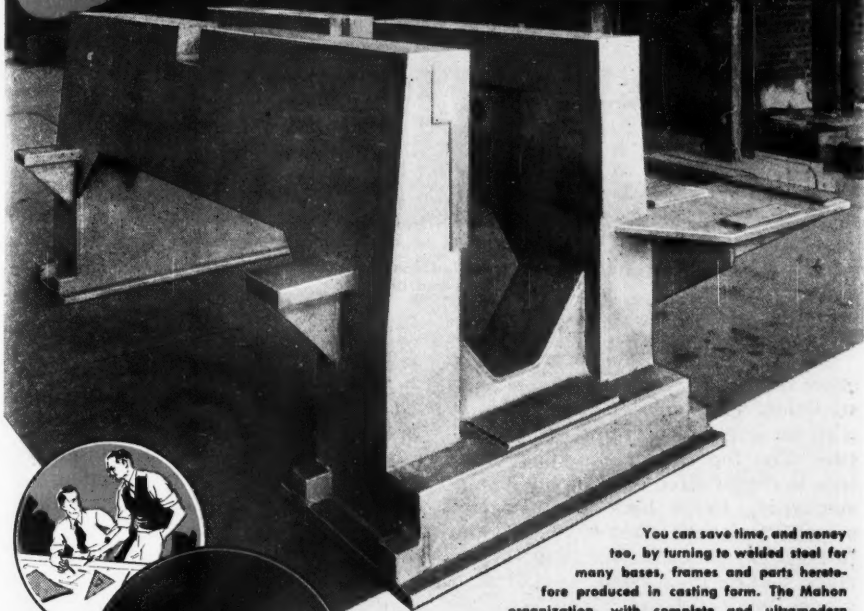
SAFETY ENGINEERS

611 West Lake Street

Chicago 6, Ill.

Steel-Weld

FABRICATION



You can save time, and money too, by turning to welded steel for many bases, frames and parts heretofore produced in casting form. The Mahon organization, with complete and ultramodern facilities for producing, normalizing, stress analyzing, sandblasting, machining and painting, stands ready to meet your requirements regardless of size or weight. A staff of thoroughly competent design engineers and highly skilled craftsmen are your assurance of a better, smoother appearing job embodying every advantage of Steel-Weld Fabrication.

THE R. C. MAHON COMPANY
Detroit 11, Michigan

Engineers and Fabricators of Welded Steel Machine Bases and Frames, and Many Other Welded Steel Products

MAHON



Fig. 3—Special tiered skid bins for assembled chain add storage space, make chain easily identifiable and accessible.

increased three times.

The special skid bins in which the chain is stored are of welded steel construction. They consist of a skid base with an angle iron frame superstructure. The top rim of the superstructure is constructed so that the legs of succeeding tiered bins can be nested securely without danger of the bins falling. The fact that the bins have no sides makes it possible to tell at a glance what type of chain is in the

skid bin, and also to remove chain from lower bins without removing upper bins. The overall effect of the new equipment is to make a neat appearing temporary storage; permit easy handling of chain to and from assembly; temporary storage, and shipping departments; make inventory taking easy; and require less "muscle" labor in handling the chain.

Another job performed by the fork truck is the handling of waste or scrap



Abart . . . The BETTER Gears — To Specifications

Most modern gear cutting equipment for gears of any material

(96 Pitch to 4 D.P.)

Spur — 96 D.P. to 5/7 D.P. 1/4" P.D. to 18" P.D.

Bevel — 48 D.P. to 5/7 D.P. Max. P.D. 6 1/4" —Max. ratio 4:1.

Worms — 32 D.P. to 5/7 D.P. 1/2" P.D. to 5" P.D.

(1/4" P.D. to 18" P.D.)

Worm Wheels—32 D.P. to 5/7 D.P. 1" P.D. to 14" P.D.

Helical & Spiral — 96 D.P. to 6 D.P. up to 14" P.D.

Sprockets—1 1/4" dia. to 14" dia.

Send B/P or Samples
Spur, bevel, worms, helical, internal, worm wheels, spiral, and sprockets. Prompt quotation, any quantity.

ABART GEAR & MACHINE CO.
4819 W. 16th St., Chicago 50, Ill.

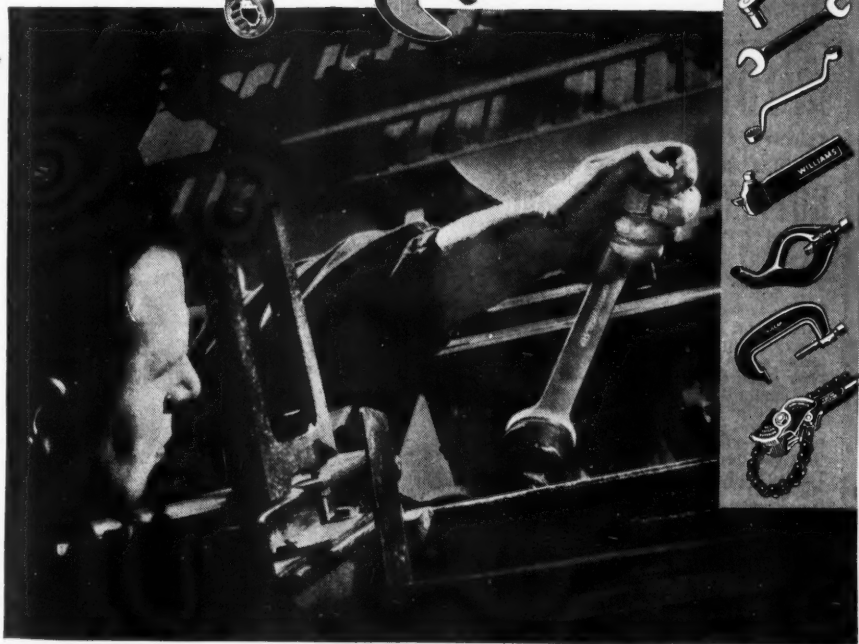
Williams "Superrenches"

FOR STREAMLINED STRENGTH

Slim, trim "Superrenches" deliver agile power to inaccessible places. Drop-forged from selected alloy steel and heat-treated, their thin, tapered jaws combine unbelievable strength with minimum bulk and weight. These versatile wrenches are made in a variety of popular patterns, with openings ranging from $\frac{3}{16}$ " to $3\frac{1}{8}$ ". Sold by Industrial Distributors everywhere.

J. H. WILLIAMS & CO., BUFFALO 7, NEW YORK

WILLIAMS
DROP-FORGINGS AND
DROP-FORGED TOOLS



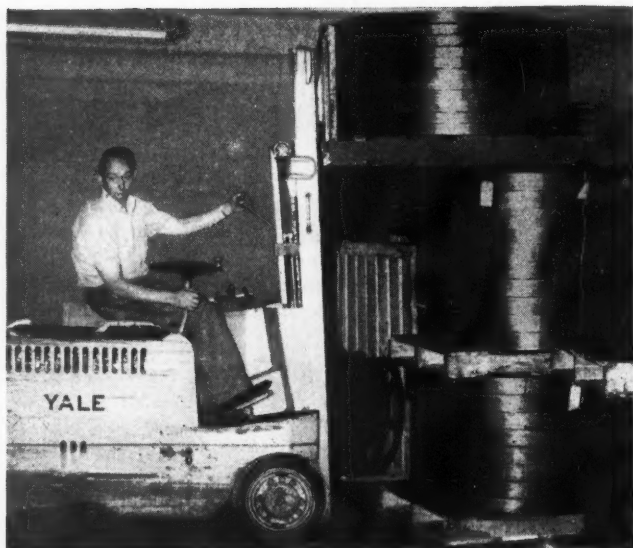


Fig. 4—Steel strip in temporary storage. By tiering the pallets, use is now made of space which formerly was wasted.

turnings, and punched-out strip have been constructed on the side of the hill so that they empty directly into rail cars located on a siding below. Scrap is collected in a large skid dump-hopper within the plant. The metal-hopper is then picked up by the fork truck, car-

metal. The Ithaca plant is located on a hill, and separate bins for slugs,

ried to the refuse bins, and dumped as shown in Fig. 5.

MODEL No. 16 "SPECIAL"

CONSTRUCTED AS PER SPECIFICATIONS OF U. S.

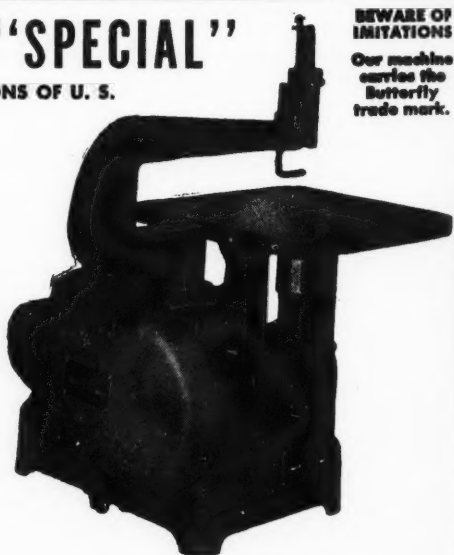
NAVAL AIRCRAFT FACTORIES
**BUTTERFLY FILING and
SAWING MACHINE**
(Die Making Machine)

This is a very heavy, powerful machine and is designed for extra heavy filing and sawing, but it performs small work just as well. This type of machine is usually adopted in Ammunition Plants, Airplane Factories and machine shops where heavy and precision filing and sawing is desired. We also manufacture smaller models—Model D—10" Table; Model E.L.—12" Table. Model No. 14—14" table and heavy pedestals for all our machines.

HARVEY MFG. CORP.

161 GRAND ST., NEW YORK 13
Inquiry Dept.

Phone Canal 6-5170



**BEWARE OF
IMITATIONS**

Our machine
carries the
Butterfly
trade mark.

Registered U. S. Patent Office

p in
age.
lets
e of
nerly

and
strip
con-
the
ll so
pty
rail
on a
low.
ected
kid
o p-
the
etal-
hen
r the
car-
ed as

E OF
ONS
line
the
ity
ark.

ry 1948



BESLY TAPS

ARE PART OF THIS PICTURE

... they cut accurate threads
for Mercury Outboard Motors



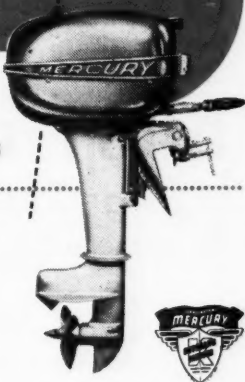
Useful Facts for TAP USERS

Get a free copy of this practical reference manual. It was prepared by shop men for shop men. Tap fits and drill sizes are listed in detail. Write today on your letter-head for a copy

For close tolerance threading of aluminum outboard motor parts the Kiekhaefer Corporation, Cedarburg, and Fond du Lac, Wisconsin, relies on Besly hand, high speed machine screw taps to help achieve the power and reliability for which Mercury Motors are world-famous.

Whatever the needs of the job may be, Besly Taps—for more than 50 years—have proved their capacity to meet the most difficult specifications for economical precision threading in all types of work.

Besly engineers are ready to help you select the right tap for the job. Ask your distributor about Besly Taps and Besly service.



BESLY

**BESLY TAPS • BESLY TITAN ABRASIVE WHEELS
BESLY GRINDERS AND ACCESSORIES**

CHAS. H. BESLY AND COMPANY • Company Stocks at Chicago and Detroit
118-124 North Clinton Street, Chicago 6, Illinois • Factory: Beloit, Wisconsin

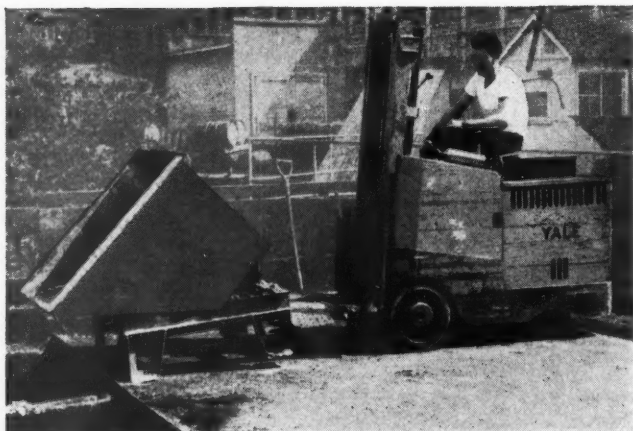


Fig. 5 — Electric fork truck is used to dump waste punchings into bins for delivery to rail cars below.

Finished chain is packed in cartons on the second floor of the plant and is transported by elevator down to the first floor for weighing and shipping. Two fork trucks operate as a team in this operation. The second floor truck

transports the packaged chain, stacked on pallets, and loads it onto the elevator. The elevator then descends to the first floor and the first floor truck unloads it and carries the car-

tons to a roller conveyor. Meanwhile the second floor truck is returning for another pallet load. Packaged chain is placed on a roller conveyor about 2 feet wide which passes an operator who binds the car-

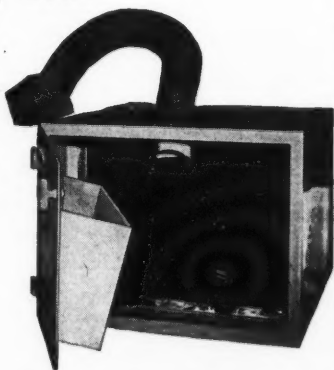
DUST COLLECTOR

for Surface Grinders, etc.

The Type S is an inexpensive dust collector designed for machines which are used intermittently and which cannot readily be connected to an exhaust system. Easily moved around shop.

The front of the box is a hinged door for easy inspection. Capacity—325 CFM at 3 1/4" W. G. Static suction of 2" W. G. in a suction nozzle with 4' of 3" dia. flexible metal hose. 1/2 H. P. motor.

Write for illustrated folder
Inquiries from dealers
invited.



COLONIAL BLOWER CO.

17 FRANCIS AVE.

HARTFORD, CONN.

Specify ATLANTIC

BAND SAW BLADES

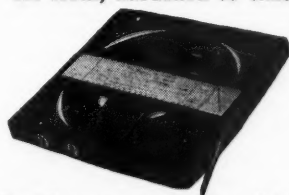
For

Smoother

CONTOUR CUTTING



*A*TLANTIC SAWS meet all of your requirements for a superior blade on complicated die and fixture radius cutting. ATLANTIC specializes in accurate milled and precision set teeth, hardened to exact temper.



Atlantic's strong, practical box, plainly marked on sides and top. Remains in good condition until entire coil is used.

ATLANTIC'S special alloy steel insures longer wear and easier welding.

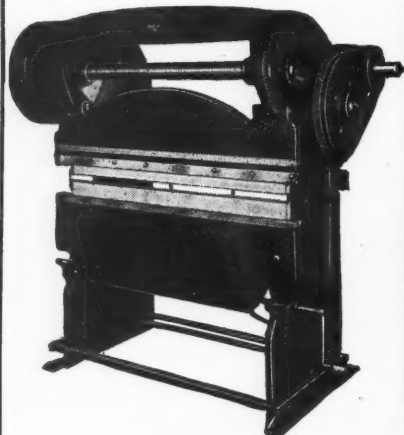
ATLANTIC'S one temper saw for all metals reduces stock you have to carry. Cut to length and welded, ready for use. Packed in strong Atlantic box. Write for new Atlantic Catalog.

Atlantic Saw Mfg. Co.
INCORPORATED

Exclusively Manufacturers of Band Saw Blades
155 Brewery St., New Haven, Conn.

CHICAGO STEEL PRESS BRAKE

New Type "300"



SPEED PRODUCTION OF SHEET METAL WORK

USE FOR

1. FORMING
2. EMBOSING
3. MULTIPLE PIERCING
4. NOTCHING
5. BLANKING

The New Type "300" CHICAGO STEEL PRESS is accurate, compact, and ruggedly constructed of highest quality materials. Sizes 4, 5 and 6 ft. capacities up to 10 gauge.

DREIS & KRUMP MFG. CO.
7418 LOOMIS BLVD. • CHICAGO 36
ILLINOIS

tons with strips of steel before weighing and shipment. In some cases, chain is crated for shipment and the crating is done in the shipping room. A $\frac{1}{2}$ -ton electric hoist with a special grab attachment is used to lift full crates onto the conveyor. The grab is a tong-like affair with transverse angle pick-up elements about 8 inches long as



Fig. 6—Yale $\frac{1}{2}$ -ton hoist is used to load crated chain onto roller conveyor.

shown in Fig. 6. The angles engage wooden cleats which form part of the crate and when the hoist hook is raised, the tong tightens on the cleats, and the crate is lifted. This particular hoist is operated by a bar grip control which the operator controls with one hand. Each end of the bar is connected to the hoist motor by means of a rope, and when the operator pulls down on one side of the bar the hoist lifts; when he pulls down on the other side the hoist lowers.

The platform of the Kron scale



Found in the BEST PRODUCTS

• Any product is only as good as its fastenings. The best-made machines and equipment always employ fastenings that are as capable and efficient as the products of which they are a vital part.

Chicago "Safety Plus" Socket Head Screws are used in many of the finest screw-fastened products manufactured today. They improve these products by providing the greatest fastening strength with the least possible weight.

"Safety Plus" fastenings are made of the highest quality materials and manufactured under the most modern processes. They are close-tolerance tested throughout every step of production to assure absolute perfection in thread and dimension. You'll find them superior in every way for your product.

*These Fine Products are sold only
thru Authorized Distributors*

CHICAGO "Safety Plus" line includes:

Socket Head Cap Screws
Socket Set Screws
Stripper Bolts
Square Head Dog Point Set
Screws
Socket Pipe Plugs
Keys for "Safety Plus"
Products

Complete line includes:

Hexagon Head Cap Screws
Square Head Cup Point Set
Screws
Headless Set Screws
Fillister Head Cap Screws
Flat Head Cap Screws
Taper Pins
Milled Studs
Semi-Finished Hexagon
Nuts
Semi-Finished Hexagon
Castellated Nuts

THE CHICAGO SCREW CO.

ESTABLISHED 1872

1026 SO. HOMAN AVENUE

CHICAGO 24, ILL.




Fig. 7 — Scale platform makes up a section of the shipping department conveyor. Cartons are weighed for shipment without being taken off the conveyor. Large Kron scale dial makes it easy for the operator to read and record weights.

shown in Fig. 7 upon which the cartons are weighed before shipment by truck is built as a section of the roller conveyor. The cartons roll right onto the rollers which make up the scale platform. A girl standing directly before the dial of the scale halts the carton, checks its weight by glancing at the scale dial, marks it on the carton, and shoves the carton along the conveyor to be loaded onto a freight truck. The scale weighs up to 1000 lb. and is marked off in 1-lb. graduations.

ing pallets and skid bins, decreased the "muscle" labor required in handling operations, facilitated store-room operations, and speeded miscellaneous handling operations.

The Yale electric hoists have cut handling time and made easy work of jobs which were formerly awkward and time-consuming. The special small pallets have made it possible to tier small coils of strip steel without consuming the space large pallets would demand.

The main savings effected by the new system were those made possible by the three new electric fork trucks. These trucks have made it possible to add storage space to the plant by tier-

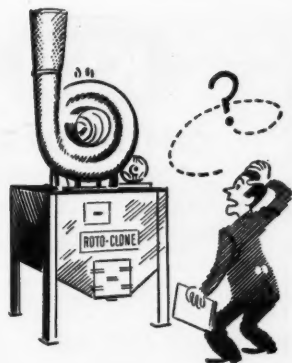


Write for
New Catalog
Box 58-C

MARSHALL STEEL
LISLE, ILLINOIS

Stop Wasting Time on Cutting, Shaping
and Grinding Die Blanks when you can
Buy ready-to-use
Precision
GROUND FLAT STOCK
velvet finish
Special Sizes Heat-Treated or Soft,
Ground to Your Specifications.

To buyers of
WAR SURPLUS
ROTO-CLONES
we offer our
cooperation



Our equipment serves you best when applied the right way to the right job. Make sure you have the proper unit for dust control service in your particular operation.

**SEE YOUR LOCAL
 AAF REPRESENTATIVE
 FOR THIS FREE SERVICE**

- ★ Proper Application of Roto-Clone to Your Job
- ★ Proper Installation
- ★ Operating Instructions
- ★ Maintenance Instructions

AAF

ROTO-CLONE
DUST CONTROL EQUIPMENT

MUCH of the Roto-Clone equipment, now being offered as Government War Surplus, was built for a single and specific wartime purpose rather than a peacetime production job. Then, too, dust control equipment must conform to existing State, Federal, and Industrial Codes.

We're interested in seeing that every Roto-Clone user is a satisfied and enthusiastic owner of our equipment. Experience has proved this to be a sound policy as evidenced by the fact that one Roto-Clone installation, properly applied and installed, results in an average of 9 future sales.

To insure maximum service benefits, American Air Filter offers its experience and facilities to buyers of war surplus Roto-Clones. You can always depend on American Air Filter to offer you the finest of service and find the answer to problems of dust control. Please call upon us.

American Air Filter Company, Inc.
 100 Central Avenue, Louisville 8, Ky.

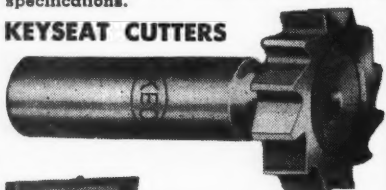
KEO

CENTER DRILLS



Made of finest high speed steel. Available in all standard sizes. Always in stock for immediate delivery. Specials made to your specifications.

KEYSEAT CUTTERS



High speed. Right hand. $\frac{1}{4}$ " shank. Diameters from $\frac{1}{4}$ " to $1\frac{1}{2}$ ". Standard sizes in stock for immediate delivery. Complete set—41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.

CENTER REAMERS



High speed steel. Reamers from $\frac{1}{4}$ " to 1" regularly furnished with 60°, 82° or 90° included angle. Specials made to your specifications.

LATHE MANDRELS



Precision made of tool steel, hardened and accurately ground. Tapered .0005" to the inch. Mandrels from $\frac{3}{16}$ " to 1" are .0005" undersize at small end, from $1\frac{1}{16}$ " to 3", .001" undersize. Immediate delivery.

Write for Literature

Illustrated literature and prices on all KEO Products mailed on request.

KEO CUTTERS

19326 Woodward - Detroit 3 Mich.

The special skid bins make the contents easily identifiable, transportable and accessible. The scale installation makes it possible to weigh the packaged chain without taking the carton off the conveyor, thereby saving two handling operations.

These savings in time, space, and muscle have, of course, resulted in lower manufacturing costs, in fact, the savings made possible by any one of these three production factors would financially warrant the installation of the handling equipment.

"Cutting Fluids for Better Machining,"

Revised Edition. A completely revised edition of its booklet of metal-working information, "Cutting Fluids for Better Machining," has been published by the D. A. Stuart Oil Co., 2741½ S. Troy St., Chicago 23, Ill. The booklet, which comprises 72 pages, contains considerable data on the application of Stuart oils for cutting, grinding, drawing, quenching, and tempering, as well as other phases of metal-working and industrial lubrication. In addition, the booklet contains useful sections on metal cutting mechanisms, the selection of cutting fluids, and rules for prolonging tool life, together with handy tables of standard steel specifications, independent research committee data, and a marking system chart for grinding wheels.

Copy of the pocket-size booklet is available free to mechanical executives addressing requests on their company letterheads.

G & L 351-T Horizontal Boring, Drilling, and Milling Machine is illustrated, described, and covered as to specifications in a six-page folder now available free from the Giddings & Lewis Machine Tool Co., Fond du Lac, Wisconsin.

Bay State Abrasive Products Price List. A folder containing pricing and discount data on all kinds of vitrified, silicate, resinoid, shellac, and rubber bonded grinding wheels, discs, segments, and mounted wheels and points is now available free from the Bay State Abrasive Products Co., Westboro, Massachusetts.

on-
ble
ion
ag-
off
wo

and
ow-
the
of
uld
a of

g,"
ised
ing
tter
the
St.,
om-
able
oils
nch-
ther
trial
con-
ting
ing
life,
dard
arch
stem

vail-
ad-
let-

Drill-
ated,
ifica-
lable
chine

Price
d dis-
sili-
onded
and
avail-
rative
etts.

y 1948

OK 400 inserted carbide tipped tool bits and holders

Operating data
and Price List
on request



TOOL COMPANY



For the first time you can interchange from 16 different cutting speeds of carbide and use the advantage of interchangeability of tool bits for turning, boring and facing operations. Here is a tool that is carefully designed. The design is based on the OK 400 carbide tool bit. Tool bits cannot wear out any time, under any pressure. The design is based on a scientific system of dimensions, 16 different sizes for each and entire grinding time to the customer. Continued.

1. One holder with 16 interchangeable tool bits. 2. Boring tools. 3. Turning tools. 4. Facing tool for both right and left hand, for each side of holder.
5. Five sizes of holders, No. 1, 2, 3, 4 and 5. 6. Five sizes of tool bits, No. 1, 2, 3, 4 and 5. 7. Five sizes of tool bits, No. 1, 2, 3, 4 and 5. 8. Five sizes of tool bits, No. 1, 2, 3, 4 and 5. 9. Five sizes of tool bits, No. 1, 2, 3, 4 and 5. 10. Five sizes of tool bits, No. 1, 2, 3, 4 and 5. 11. Five sizes of tool bits, No. 1, 2, 3, 4 and 5. 12. Five sizes of tool bits, No. 1, 2, 3, 4 and 5. 13. Five sizes of tool bits, No. 1, 2, 3, 4 and 5. 14. Five sizes of tool bits, No. 1, 2, 3, 4 and 5. 15. Five sizes of tool bits, No. 1, 2, 3, 4 and 5. 16. Five sizes of tool bits, No. 1, 2, 3, 4 and 5.

Good Foremanship Is Important

By ERNEST W. FAIR

METHODS whereby the selection of foremen and supervisors is based solely upon their knowledge of materials and machines are obsolete in today's machine shop management. High overhead and production costs, much higher payroll costs and the need for topnotch leadership demand a great deal more of foremen and supervisors. Old methods are definitely out.

The following paragraphs comprise a review of a number of standards used by present-day industrialists in selecting leaders; the best points have been screened from more than a score of cases and have been condensed to serve as a guide in the selection and training of foremen and supervisors on a basis of today's standards only.

The number one job of today's foreman is production. He has to know machinery, production control and how to blend the two important elements — workers and machines — into a smooth operating unit. Being a good mechanic is no longer sufficient qualification.

Every machine shop supervisor must have a spark of real leadership in his soul if he is to do his job satisfactorily under the turbulent conditions that prevail today. That means that he must be familiar with all of the details of his job and be well aware of his responsibilities; further, he must have the nature, background and temperament to be able to handle those re-

sponsibilities successfully.

Good foremanship today requires the ability to instruct the workers in the proper performance of their individual tasks; he must be able not only to develop many inexperienced employees but also to impart the qualities of leadership to the "old timers" so that they in turn can help the newer workers to adjust themselves to quicker and more efficient operation of the equipment. He must also have the leadership and skill to spot shop operation methods which can be improved and to devise methods by which those improvements can be made at lowest possible cost.

A foreman or supervisor who does not possess full and complete knowledge of his job, the plant processes, equipment and machines, modern machine shop methods and technical skills is handicapped in today's operations and will be even more handicapped in tomorrow's more competitive situation. If he does not possess these skills, he can well embark upon an immediate program—either of his own volition or through company assistance—toward acquiring the knowledge which he must possess in order to do his job properly in the period just ahead. In the shop where supervision is inadequate, production costs will continue to rise—and that means financial troubles for even a sound industrial institution today.

Tomorrow's machine shop supervisors must have full front-office cooperation in the handling of their jobs, and that cooperation should begin with the establishment of a well-rounded job instruction training program for the shop. Such a program is designed to prepare the workers for their jobs, and follow through to actual shop operation. The shop foreman or supervisor must have the ability to maintain such a program, and the management must see to it that he has the executive help required to produce the desired results.

Long experience and practice has proved that some of the best ideas for improving methods in our shops come directly from the workers, and a good foreman will know how to encourage the contribution of such ideas. Good foremanship today requires a particular skill in leadership; the "straw boss" technique is definitely obsolete. A real

leader will be recognized without any special effort on his part, and will know how to lead his department organization to successful production as the director of a fine orchestra leads his musicians to the successful completion of a symphony.

Maintenance of a high level of supervision requires constant study and training of foremen and supervisors. Such training must largely be a matter of self-teaching through study courses, attendance at management clinics, wider use of trade journals and textbooks on management and supervision, and so on. In this step the average foreman or supervisor needs a great deal of help from the plant management; help that will provide the opportunity for such study, and that will make available to him the knowledge of new techniques in management and supervision.

SAVAGE NIBBLING MACHINE

FOR FAST ACCURATE CUTTING OF
FLAT SHEETS BY TEMPLATE OR TO
A SCRIBED LINE-TUBE SLOTTING
AND SHAPING

Sheets
Flat mild $\frac{3}{4}$ "
Tough alloys $\frac{1}{2}$ "

Tubing
Wall thickness to $\frac{1}{4}$ "
1" I.D. to 36" O.D.

"NIBBLE YOUR COSTS"

Low initial investment.
Eliminates expensive dies.

ASK FOR FREE BULLETIN "H"

Manufactured By

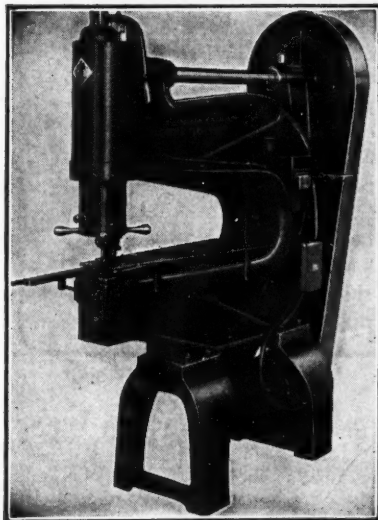
W. J. SAVAGE COMPANY

Since 1885

KNOXVILLE

TENNESSEE

Pioneer Manufacturers of Nibbling Machines



MATERIAL SAVINGS



Precision shim stock in special dispensing cartons... easy to handle, cut and stock.

Simply pull out the desired length of shim stock and cut. Prevents damage to paper-thin brass and steel in handling.

Brass and steel precision shim stock, 6 x 100 inches, packaged in dispensing cartons (in gauges up to .012).

Heavier gauge sheets packed flat (6 x 100 inches... four 6 x 25 sheets... in heavy duty envelopes).

The full line of packaged shim stock is carried by recognized industrial distributors.

3007

Laminated Shim Co., Inc.
59 Union St., Glenbrook, Conn.

Today's foremen and supervisors also need a great deal more knowledge of general business management problems than were required of yesterday's plant executives. Production control is rapidly becoming as much a responsibility of the foreman as it is of the executive management. Unless foremen and supervisors have training in production control and general management principles, and unless they know and understand how these principles are directly applicable to their own jobs, they cannot deliver maximum efficiency.

No machine shop can afford bad foremanship today; it may mean financial losses in the obviously more competitive situation just ahead. The foreman represents management to the plant organization, and management should see to it that he is properly trained and equipped for this responsibility.

Radiac Grinding Wheels. To assist the shop foreman or tool engineer in specifying the proper grinding wheel for a particular application, A. P. de Sanno & Son, Inc., Phoenixville, Pa., has prepared a 40-page pocket-size catalog that provides a relatively small number of basic recommendations as a starting point from which the foreman or tool engineer can easily make his own specifications to fit his particular machines. In the catalog, each manufacturing process (vitrified, silicate, resinoid, rubber, and shellac) is explained on a separate double page so as not to confuse it with any other process. The discussion includes an explanation of what grains and grades are usually supplied in that particular process. In the white central column, from top to bottom, are listed the different specifications of the grinding wheel. The right-hand column in light blue translates the meaning of each symbol, thus making it easy for the user to alter the specification and to obtain the wheel adapted to his particular needs.

The catalog features an attractive four-color cover which is highly lacquered to withstand constant handling in the tool room. Copies are available free to plant managers, purchasing agents, shop engineers, and so on, requesting Catalog 103.



Pines Bender Simplifies Operation ... Results in 360 Bends Per Hour

On this job, three accurate bends are made in different planes, meeting close tolerances, without scratching the polished tubes ... at a production rate of 2 pieces per minute or 6 bends per minute on a Pines Bending machine. Prior production on other equipment was less than one piece per minute.

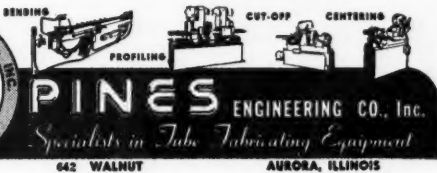
Every Pines Bending machine has ample capacity and power to produce a full range of bends and handle heavy-walled stock on SERPENTINE BENDS, STACKED COILS, RETURN BENDS, ROUND COILS, SQUARE and RECTANGULAR TUBES, SPECIAL ROLLED and EXTRUDED SECTIONS and other bent forms ... with the accuracy required and without wrinkling.

Write for Pines engineering service to show you how to produce quality bends on a high production basis and at lower costs ... no obligation, of course.



Now

send for your **FREE** copy of the new Pines Catalog 106A describing the Pines Principle of Bending and Pines Bending Machines.

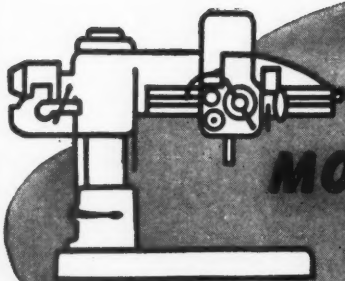


PINES ENGINEERING CO., Inc.

Specialists in Tube Fabricating Equipment

642 WALNUT

AURORA, ILLINOIS

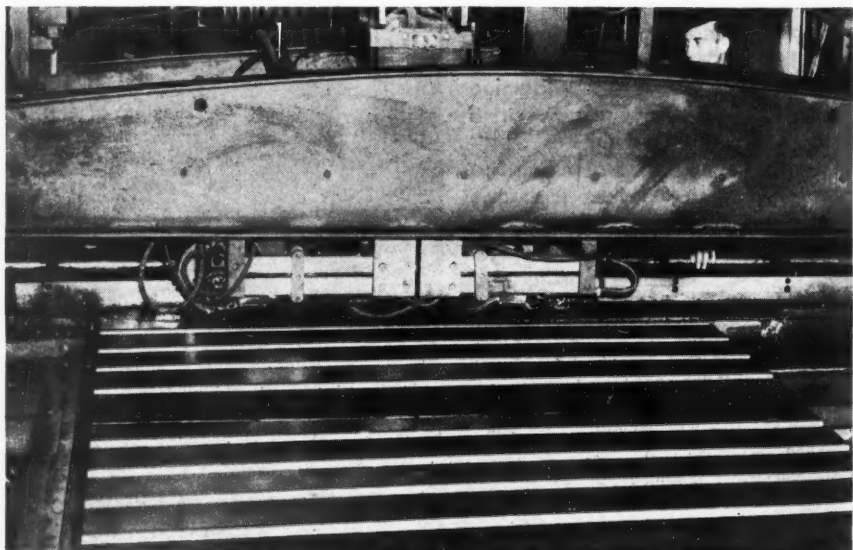


MODERN EQUIPMENT AT WORK

Progressive Dual Seam Welder Aids Trailer Body Production

ONE of the reasons why trailer manufacturers have been able to increase body production is found in the application of newly developed

welding units of the type shown in the accompanying illustration. This machine, a dual seam welder designed by Progressive Welder Company, Detroit, Mich., is turning out complete side and top panels for all sizes of trailers at the Fruehauf-Carter Division of the Fruehauf Trailer Company, Memphis, Tenn. The panels for trailer bodies are



Progressive Dual Seam Welder in Operation at the Fruehauf-Carter Division of Fruehauf Company



IT TAKES SOMETHING EXTRA TO BE A Specialist!

No one questions the traditional skill of the glass blower. His "know how" . . . like that of the precision machinist who fashions perfect BATH taps, is the result of special aptitude and years of exacting experience.

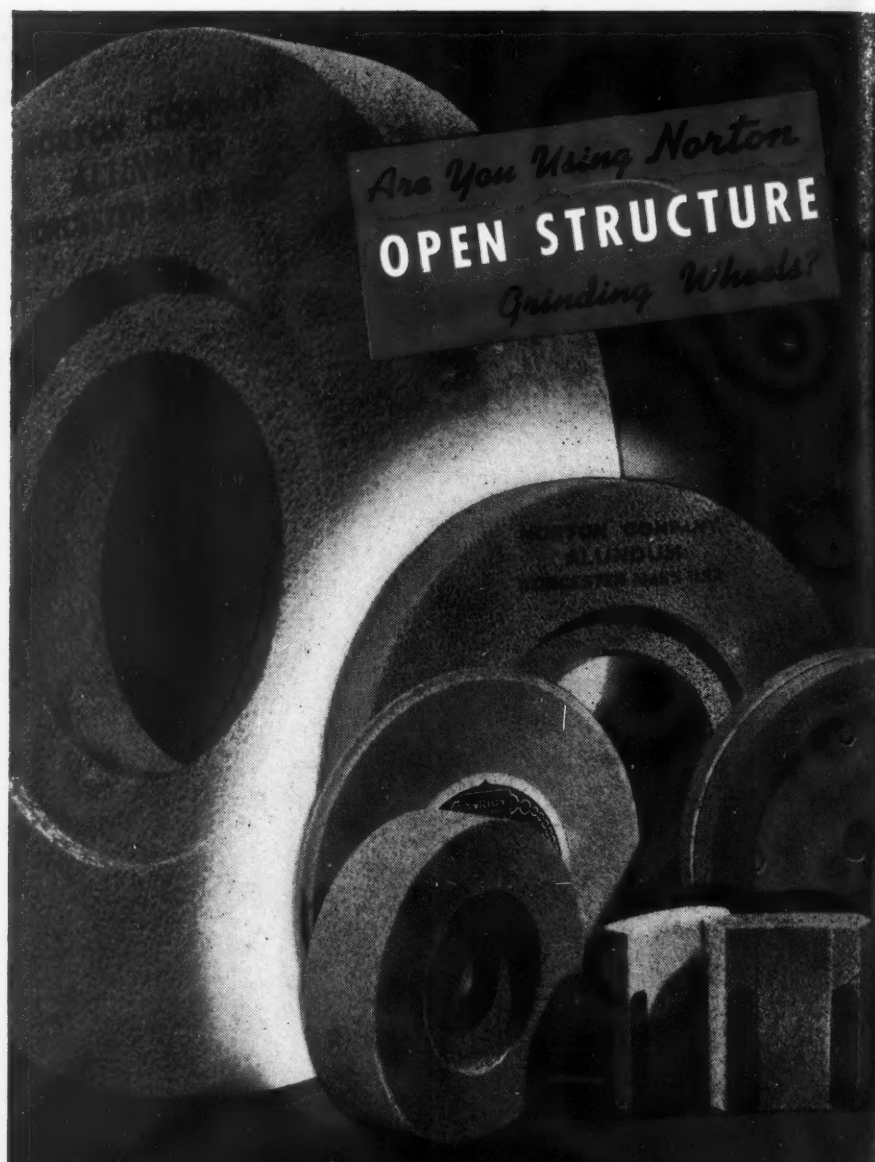
BATH ground thread taps are toughened by hardening and tempering—then ground from the solid to exact specifications for stock and special sizes. You get extra long wear in all taps with the name BATH on the shank—they're made by master craftsmen! See your BATH representative or write direct about your tap problems.

(Transportation is paid to your plant on all Bath products)

JOHN BATH CO. INCORPORATED

20 Grafton Street
WORCESTER 8, MASS.

GROUND THREAD TAPS • PLUG AND RING TAPS • TAPERS • INTERNAL MICROMETERS



Are You Using Norton
OPEN STRUCTURE
Grinding Wheels?

ABRASIVES — GRINDING WHEELS — GRINDING AND LAPPING MACHINES
REFRACTORIES — POROUS MEDIUMS — NON SLIP FLOORS — NOBIDE PRODUCTS
LABELING MACHINES (BEHR-MANNING DIVISION COATED ABRASIVES AND SHARPENING STONES)

Their Fast, Cool Grinding Action Can Cut Costs On Many Jobs

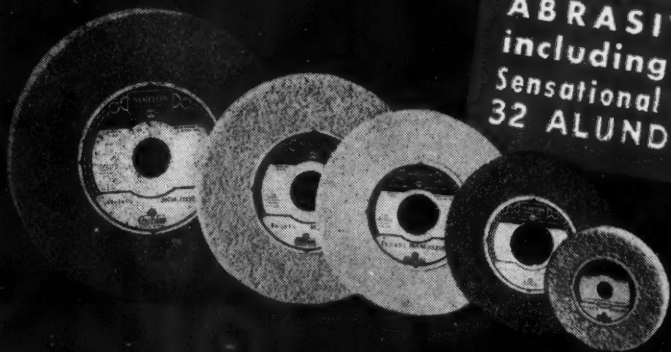
IF YOU have jobs where stock removal is heavy, where contact is broad or where extra coolness of cut is essential, it will pay you to try Norton OPEN STRUCTURE grinding wheels.

They are available in the several varieties of Alundum abrasive; also in Crystolon abrasive for grinding carbide tools. The combination of OPEN STRUCTURE and the new 32 ALUNDUM* abrasive is showing truly remarkable results in many plants.

Let a Norton abrasive engineer study your grinding jobs and specify OPEN STRUCTURE where it can save you time and money.

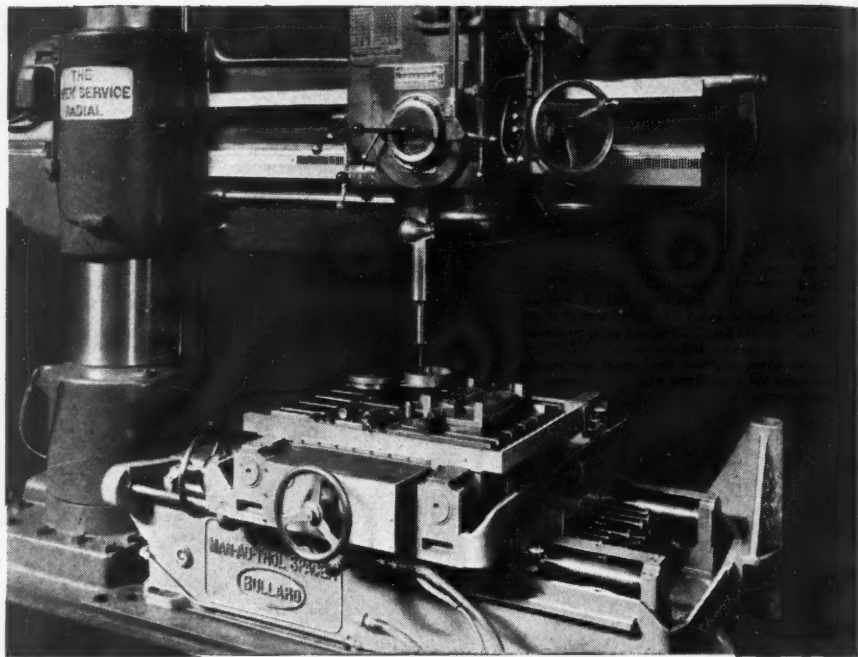
NORTON COMPANY • Worcester 6, Mass.
Distributors in All Principal Cities

**Available in
All NORTON
ABRASIVES
including the
Sensational New
32 ALUNDUM***



NORTON ABRASIVES

INES
DUCTS
ONES)



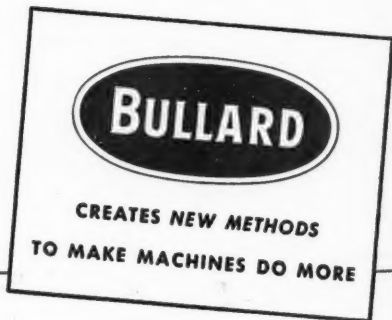
NEW BULLARD MAN-AU-TROL SPACER

Eliminates Hole-Locating Jigs and Fixtures

The BULLARD MAN-AU-TROL SPACER now on the production line is more than living up to its advance notices. Machines and men formerly tied up on the non-productive work of making hole-locating jigs are now doing the kind of productive work that cuts operating overhead, develops competitive price advantages and steps up profit. Drilling, boring, reaming and tapping volume and accuracy are reaching new peaks... while operators' fatigue is measurably reduced.

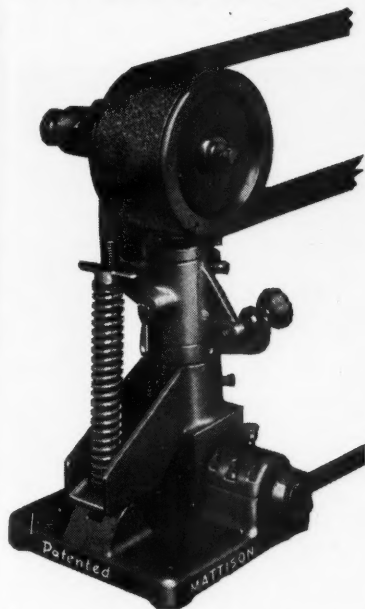
To bring yourself up to date on this revolu-

tionary new hole-locating method, write for complete information. The Bullard Company, Bridgeport 2, Connecticut.



Mattison

ABRASIVE - BELT BACKSTAND IDLER

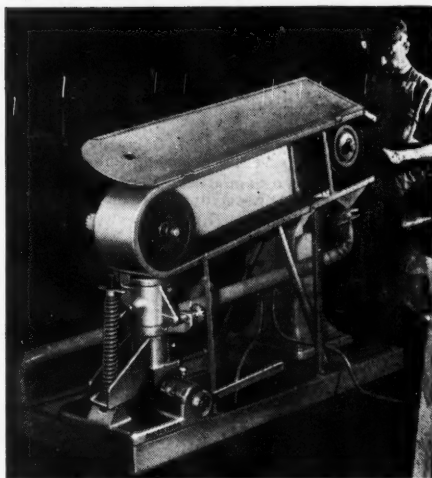


Converts
THE REGULAR GRINDING
AND POLISHING LATHE

To
THE USE OF
FACTORY-COATED
ABRASIVE BELTS



Many manufacturers have definitely determined the greater efficiency and economy of using abrasive belts over set up wheels. There are fewer rejections due to mild scratches, uniform results, less chance of burning or discoloring, lower polishing cost per piece, as a result of increased production. THE MATTISON ABRASIVE BELT BACKSTAND IDLER enables you to take advantage of this method at a very small investment. You use your present lathe and set the Backstand Idler in the rear. For complete information send for our new free circular giving complete details.



MATTISON

MACHINE WORKS

ROCKFORD • ILLINOIS

formed by lap welding together narrow panels to form large weathertight panels, up to nine feet wide, and to any length desired. Use of two wheels has reduced the already short welding time in half, since half of each seam weld is formed by each wheel as it rolls across the panel. Only one minute is required to make from eight to 24 feet of weathertight seam, depending on the thickness of the metal used in the specific panel.

Whitney-Woodruff TYPE KEYS

*Lower Production Costs and Provide
Greater Ease of Assembly*



Check These Advantages

- ✓ Eliminate skilled labor in key-seat cutting and key-fitting operations.
- ✓ Flat key bottom and starting radius on the edges simplify assembly.
- ✓ Key reaches deep into shaft and is firmly imbedded, enabling it to withstand greater strain.
- ✓ Greater resistance to shaft fracture due to shape of key seat and permanent key fit.

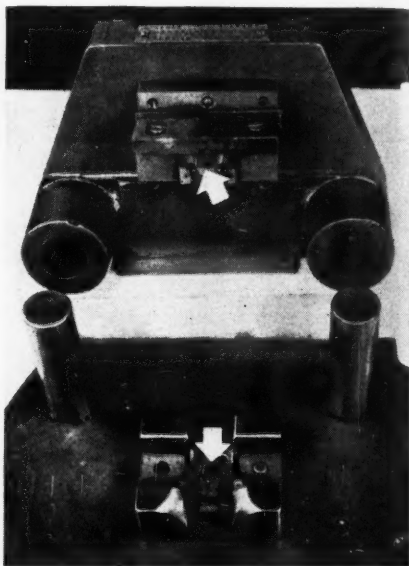
Made in American standard sizes and Whitney standard sizes for special application.

Available from Whitney Distributors throughout the country. Or write:

WHITNEY CHAIN & MFG. CO.
HARTFORD 2, CONN.

Carboloy Swaging Blocks Reduce Wear in Dies at Underwood

SMALL Carboloy cemented carbide swaging blocks set into die blocks are reported to be creating an overall



Arrows Indicate Small Carboloy Cemented Carbide Swaging Blocks in Set of Dies

saving in time and money at the Underwood Corporation, Bridgeport, Conn., by virtually eliminating the



**VARIOUS WIDTHS
and GAUGES**

HINGES



**BUTTS AND
CONTINUOUS LENGTHS**

WRITE FOR PRICES

S & S MACHINE WORKS

4533 W. LAKE STREET HARDWARE DIVISION CHICAGO, 24, ILLINOIS

For
**GUARDS
CABINETS
CASES
BOXES**

Silver Streak

fleshing new addition to a famous line
CHICAGO WHEEL & MFG. CO.

Headquarters for
MOUNTED WHEELS and SMALL GRINDING WHEELS

• Here's a sensational grinding wheel . . . it's the startling, shining **SILVER STREAK**, engineered for super-swift performance, unprecedented efficiency in grinding and finishing; kept constantly **FRESH** by a protective metallic film! Try it yourself! Stronger than words is the proof you will see for yourself, in your own plant, that the new **SILVER STREAK** is the wheel you can't afford to pass by, the wheel that solves your grinding problems. Tell us the kind of job you have. We'll send a test **SILVER STREAK** promptly.



Send for Catalog of Chicago grinding wheels, mounted wheels and tools.

MOUNTED WHEELS
the largest assortment
available.

- GRINDING WHEELS
- HANDEE, Tool of 1001 Uses
- HI-POWER GRINDER
- The new HANDEE "44"

CHICAGO WHEEL & MFG. CO., 1101 Monroe St., Dept. MM, Chicago 7, Illinois.

- ☐ Send Test Wheel for use on _____
☐ Send catalog of complete line.

Name

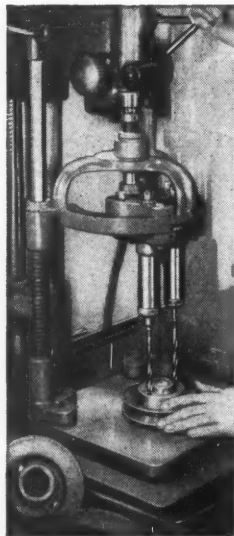
Address

LINDERME

USERS SAY:

Production UP...

Costs DOWN!



2 HOLES • 1 STROKE

That's simple arithmetic with a LINDERME Two Spindle Adjustable Drill Head on the job. Here's a drill head low in price, high in productivity. Its versatility makes it a gold mine. Linderme Drill Head users in general and production machine shops, plastics fabricators and others report great savings

from a low initial investment... It's quickly set to variable centers from $\frac{1}{2}$ to 6", drill capacity up to $\frac{3}{4}$ ", adaptable to various tapping units. Models A and B for sleeve adaptation to drill press quills; Models C and D with "over-arm" arrangement, mounted on heavy ground base for use with drill fixtures.

Write for Bulletin containing complete details.

LINDERME
MACHINE & TOOL CO., INC.
12247 COYLE AVENUE
DETROIT 27, MICHIGAN

normally high wear in equipment used to swage or flatten small fulcrum posts used in business machines.

Originally these swaging blocks—which are used in a special press—were made of hardened steel. Only about 10,000 of the cold rolled steel fulcrum posts could be swaged in a block before die reconditioning became necessary. Total die life ran between 25,000 and 30,000 operations before the die had to be scrapped.

The small Carboloy cemented carbide swaging blocks in the upper and lower die blocks, as shown in the accompanying illustration, have eliminated all die maintenance. The hard metal blocks were still in use after more than 200,000 fulcrum posts had been swaged, and had not required reconditioning. In fact, examination of the blocks failed to reveal any signs of wear.

Borizing 13 Surfaces Simultaneously

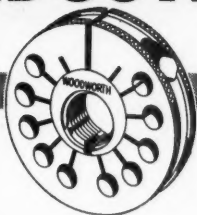
WHEN a manufacturer invests in new equipment that is more efficient and produces more perfect units per manhour than the old method, then that equipment pays dividends. Heald Borizing does exactly this, precision finishing parts on a dividend-paying basis.

A typical Borizing job is shown in the accompanying illustration. It is a Heald No. 47-A Bore-Matic tooled to finish Borize 13 surfaces simultaneously in windshield wiper heads; it bores, turns, faces, chamfers, and plunge cuts a spherical seat.

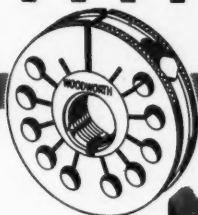
The 15-station fixture is arranged to index and clamp the parts automatically. The operator loads the front station where the first operations are performed, starts the cycle with a push button and the machine does the rest. The parts are moved from the front station to the indexing fixture for the second

WOODWORTH GAGES *ACCEPTED* BY ALL INDUSTRY !

GREEN—GO



RED—NOT GO



Industry by industry—coast to coast—
wherever accuracy and durability count—
Woodworth Company is winning and
holding new friends—with the **ACCEPTED
ADJUSTABLE THREAD RING GAGE.**



ACCURACY YOU CAN TRUST

SEND FOR—The new 1948 Woodworth Gage Catalog just off the presses. Requests for copies must be written on company letterheads.

★ There's a Woodworth representative near
to serve you. Write us for his name.

WOODWORTH

N. A. WOODWORTH CO., 1300 EAST NINE MILE ROAD • DETROIT 20, MICHIGAN
COMPLETE LINE OF PRECISION GAGES • DIAPHRAGM CHUCKS • CONE-LOK JIGS

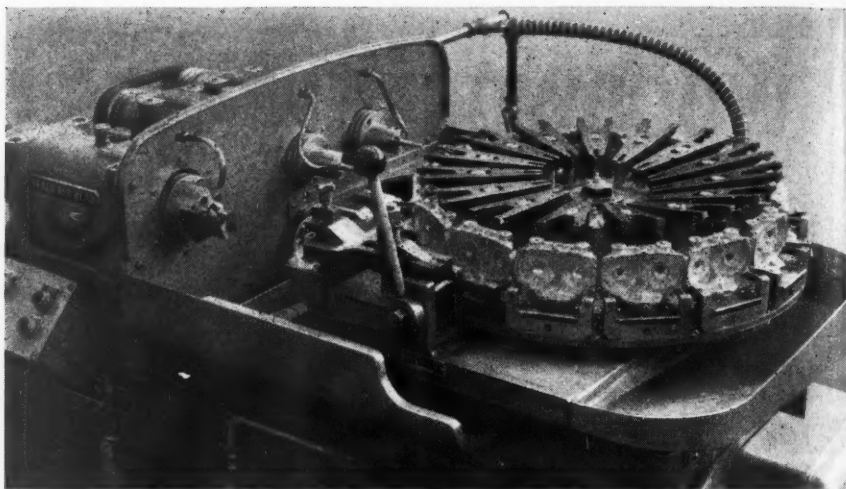


Illustration Showing a Heald No. 47-A Bore-Matic Finish Borizing 13 Surfaces Simultaneously in Windshield Wiper Heads

operation and one completely finished part is taken off the indexing fixture per cycle.

Reducing Costs with Built-Up Bending Die

BY using a "laminated" fabrication method for making the two-operation bending die shown in the accompanying illustration, Lincoln Electric Company engineers have doubled the

life of the die while cutting its production cost by 60 per cent.

The bending die is used on a 500-ton press built by The Hydraulic Press Manufacturing Company, Mount Gilead, Ohio, for bending strips of $\frac{1}{8}$ -inch plate into ring form. Following this operation the ring form ends are welded together to make an exciter frame.

The cylindrical die element used for closing is machined from tool steel, while the larger bending element is built up by welding together a number of one-inch plate sections which

AIRLOX

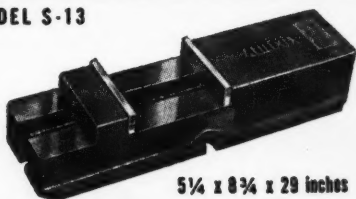
PNEUMATIC and Hydraulic Vises

Jaw force: 90 times air-line pressure

Write for Data Sheet T

production devices, inc. Whitehall, New York

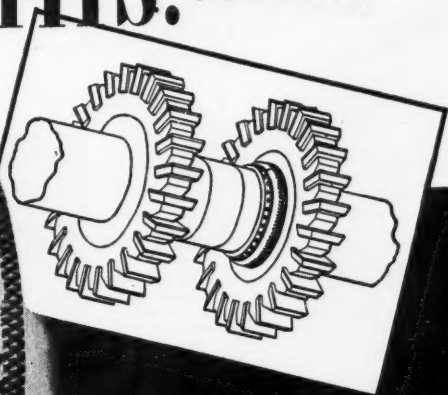
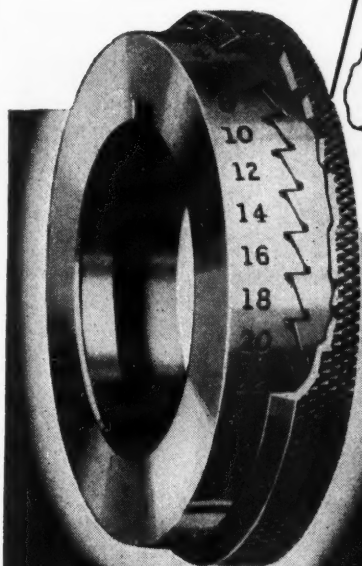
MODEL S-13



5 1/4 x 8 3/4 x 2 1/2 inches

GIVE 'EM FITS!

Here's how to "fit" the exact spacing requirements between cutters, in straddle or gang milling and multiple slotting setups.



S. J. Adjustable Spacing Collars

—manufactured exclusively by Scully-Jones, can be adjusted to make a perfect "fit," to the exact decimal space needed between cutters, without removing cutters from arbor to mount shims.

These adjustable collars have an expansion of .002" per step and a maximum expansion of .024". The teeth have a three-point bearing, at all times assuring uniform parallelism of the sides. They are hardened and ground and each tooth is ground on the side and face.

Count the Cost — Compare the Accuracy

—of Solid Spacing Collars made in your own shop—and you'll choose—

S. J. Solid Spacing Collars

These Collars are carefully heat treated,* and widths are ground parallel to .0005 plus or minus.

Prompt delivery can be made on the standard sizes of S. J. Solid Spacing Collars.

*Except sizes of less than 1/4" thick

Refer to the Scully-Jones Catalog showing over 500 types and sizes of cutting tools, collet chucks, boring equipment, centers, etc.

Scully-Jones
AND COMPANY

1909 SOUTH ROCKWELL STREET • CHICAGO 8, U. S. A.

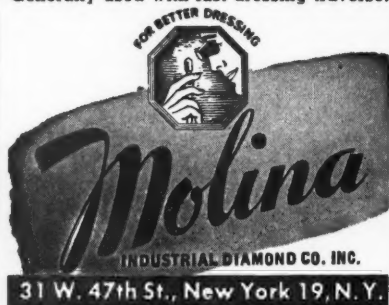
See pages 128 and 129 Scully-Jones Catalog No. 500 for Adjustable and Solid Spacing Collars.

Write us for further information.

**INDUSTRIAL DIAMONDS
DIAMOND TOOLS
DIAMOND WHEELS
DIAMOND
POWDER**



Our No. 703X—Three layers containing a total of 20 diamonds. Multiplicity of cutting points; depending on diameter of wheel, four or more diamonds will always contact the wheel, giving finer dressing and precision finish. Recommended in all straight-faced dressing and truing on wide-faced, hard silicon carbide wheels. Used most effectively on Norton Cylindrical, Landis Cylindrical, Cincinnati Cylindrical Grinder and (with special Adapter) on Cincinnati Centerless Grinder. Requires fewer passes across the wheel. Generally used with fast dressing traverse.



Representatives:

Buffalo—Iroquois Carbide & Abrasive Co.,
91 W. Grimsby Road
Pittsburgh—Commonwealth Sales Co., 200
Magee Bldg.
Chicago—J. R. Mendelssohn, 4744 Wood-
lawn Ave.
Cleveland—John P. Roberts, 501 Perry Payne
Bldg.
South Bend—Formrite Tool Co., 1311 W. In-
diana Ave.
Toledo—W. C. Sorgen Co., Box 207, Sta. B.

Moline — L. R. Christiansen
Co., 309½ 16th Street.
Milwaukee — Redi Products
Co., 211 South 2nd St.



**"There is no economic
substitute for diamonds."**

have been flame cut to contour to produce both male and female halves in a single operation. Wear points are protected with Lincoln a.c. Abrasoweld to complete operations on the long-life, low-cost die members.

Actual production has proved the superiority of the laminated construc-



View Showing "Laminated" Die

tion over the conventionally produced element for this type of bending and forming. The wear-resistant welded surface has also permitted the handling of stock with exceptionally rough and heavy scale.

Mention MODERN MACHINE SHOP when writing to advertisers. Your cooperation will be appreciated both by the advertisers and the publishers of this magazine.

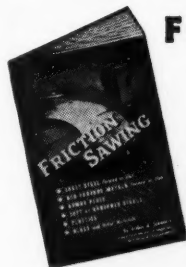
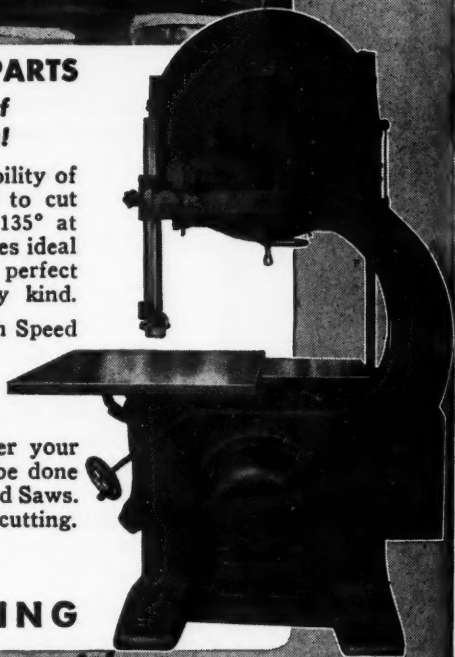
The SUPER METHOD



**of TRIMMING FORMED PARTS
and performing a host of
other metal cutting jobs!**

The negligible down-drag and the ability of Tannewitz High Speed Band Saws to cut sheet metal from 90° to near 0 or 135° at tremendous speed make these machines ideal for trimming. Cuts can be made with perfect safety without using a rest of any kind.

Friction sawing with Tannewitz High Speed Band Saws also results in perfectly amazing time savings in the cutting of flat sheets, soft or hardened steels, armor plate, plastics, glass and many other materials. Whatever your cutting problem, chances are it can be done better and faster with Tannewitz Band Saws. Investigate this "Super" method of cutting.



**FRICTION
SAWING**

with
Tannewitz

**Write for Your
free Copy**

HIGH SPEED BAND SAWS

THE TANNEWITZ WORKS **GRAND RAPIDS
4, MICHIGAN**



THE WAVY SET BLADE by MILFORD is back again!

Here is a band saw blade of unique design which, on horizontal band saw machines such as Wells, Johnson and Kalamazoo, and on all vertical cut-off machines, will . . .

- • • increase blade life an average of 30%*
- • • positively eliminate ripping of teeth
- • • cut with greater precision and closer tolerances

* from actual reports of current users

Originated by MILFORD and discontinued in the interests of standardization during the war. The efficiency of this blade, however, has been so thoroughly demonstrated on the horizontal type of machines now extensively in use, that the 3/4" 10 and 12-tooth wavy set sizes have been added to the standard list and are available for immediate shipment.

Your own machines are your best proving ground. Test a MILFORD WAVY SET BLADE against the field!

Order from your Mill Supply Distributor. He is always ready to serve your needs for all factory and mill supplies as well as MILFORD hack saw and band saw blades.

MILFORD

PROFILE AND
BAND SAW BLADES
RESISTOR AND DUPLEX
HACK SAW BLADES

THE HENRY G. THOMPSON & SON CO.

Saw Specialists Exclusively for Over 65 Years
NEW HAVEN 5, CONNECTICUT, U. S. A.

Firthaloy shop service

is practical and its benefits tangible.

Firthaloy Shop Service is a part of the purchase of every Firthaloy Die—and you are entitled to it. It gives you Firthaloy experienced die men who help you to



- set up die rooms
- train die room men in re-working dies
- help improve Firthaloy Die performance
- re-polish and re-cut dies

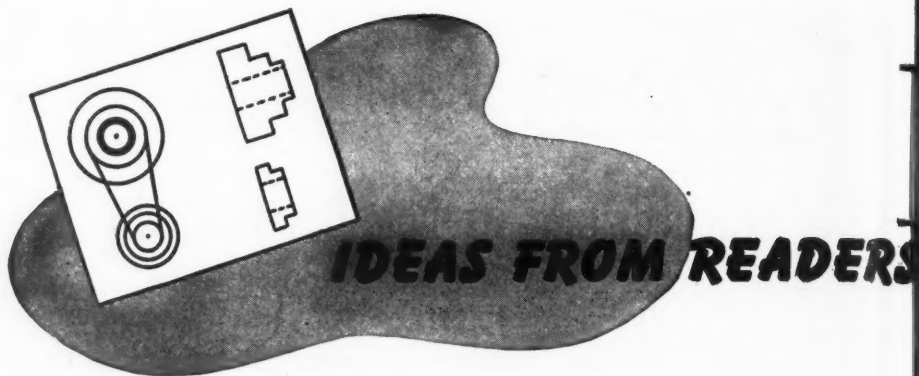
Our Service Men have always been able to assist our *customer's* shop men.

Call

Frank Sterling
STEEL & CARBIDE CORPORATION



McKEESPORT, PA. • NEW YORK • HARTFORD • PHILADELPHIA • PITTSBURGH • CLEVELAND • DAYTON • DETROIT • CHICAGO • LOS ANGELES



A Useful Drilling Jig for Uneven Workpieces

By ROBERT MAWSON

THE designing of jigs and fixtures for use in machining uneven or distorted steel stampings presents a more difficult problem than for workpieces which have a finish-machined surface. When designing a special fixture for pieces which have been previously finished on one or more surfaces, the designer can depend on at least one or

more positive locating surfaces. Having a finished surface as a starting point, the locating pins, holding down straps and other details can be laid out from a fixed position.

Steel stampings usually require a different approach. On stamped parts there is usually no finish-faced surface to work from and a further trouble is that quite often the pieces come to the plant warped in shape so that there is no uniformity in outline. To meet these conditions it is often necessary to design a compensating device as a portion of the jig in order to obtain the desired results during the machining operation.

In the accompanying illustration Fig. 1 is shown a steel stamping which came to our plant often so distorted that it was necessary to design a compensating attachment as a part of the jig in order to drill this type of piece as desired. In these stampings are to be drilled and reamed two $\frac{3}{8}$ -inch holes and one $\frac{3}{4}$ -inch hole.

The jig for machining these holes, shown in Fig. 2, is made with a cast iron base provided with two lugs in which are cast slots to hold bolts used for fastening the jig to the machine table. On the bottom finish machined surface are attached two tongues of the proper width to properly align the

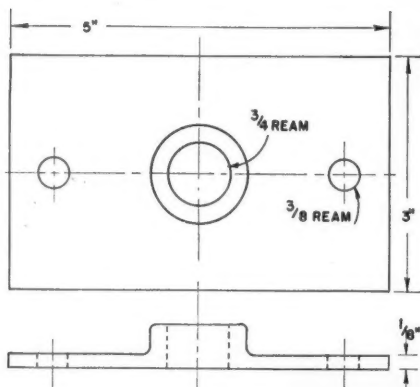


Fig. 1—Drawing of a Steel Stamping of the Type which can be Machined in Jig Shown in Fig. 2.

9 times
out of 10

CULLMAN *Stock Design* SPROCKETS

will do the job—Better!

With many types to select from—you are almost certain to find just the size you need for practically every transmission requirement — *ready for immediate delivery*. Cullman Sprockets — produced by fast, low-cost, high-precision methods — assure top operating efficiency. "Specials," too, are quickly available — made up by exclusive Cullman methods and specialized equipment.

CULLMAN WHEEL COMPANY

1352 V. Altgeld Street

Chicago 14, Illinois

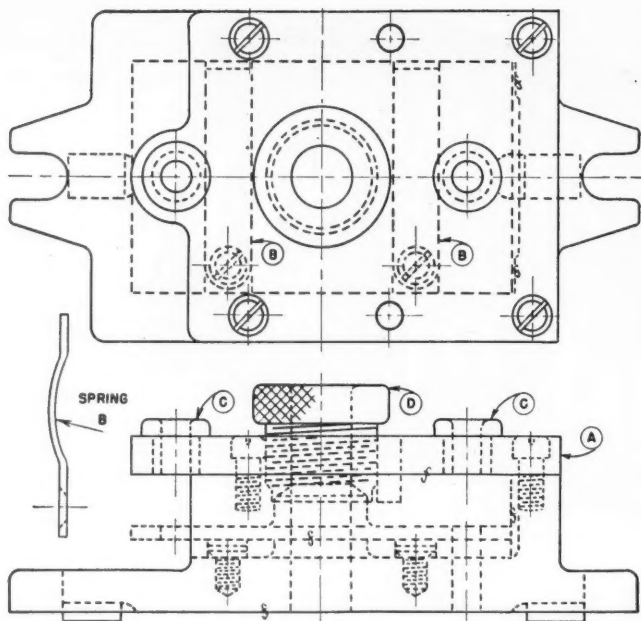


Fig. 2—Drawing of a Jig Which Can Be Used in Machining Uneven or Distorted Steel Stampings

tool steel drill guide bushings "C" in the correct locations for machining the $\frac{3}{8}$ -inch holes. Also in the guide plate is placed a locating screw bushing "D" in which has been machined a hole of the correct size for guiding the drill when machining the $\frac{3}{4}$ -inch hole. On the lower inside surface of the jig body are fastened

jig in the machine table slots.

To the upper machined surface of the jig base the drill guide plate "A" is fastened with fillister-head screws and dowel pins. The guide plate is made of machine steel and finished on all sides. The left hand end of the guide plate is machined to provide a recess for the operator to position and remove a workpiece from the drilling jig.

In the guide plate are placed two

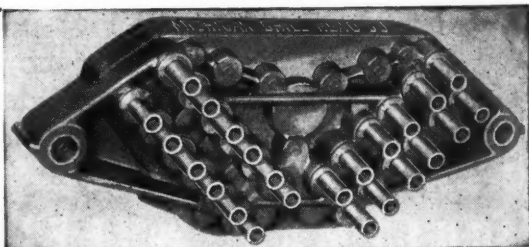
two leaf springs "B."

After the jig has been located and fastened to the machine table the operator first unscrews the locating screw bushing "D" until it will clear the piece to be machined in the jig. The operator then slides the piece into the jig from the left-hand end until he can locate the stamping by screwing down the bushing "D" onto the boss of the stamping. As this bushing is screwed

Pictured: a 24-Spindle Heavy-Duty Drill Head.

**DESIGNERS AND
MANUFACTURERS
OF MULTIPLE DRILL-
ING EQUIPMENT.**

We Invite Your Inquiry.



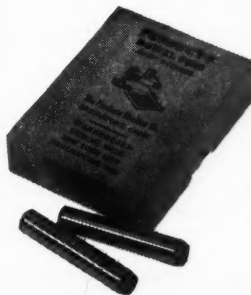
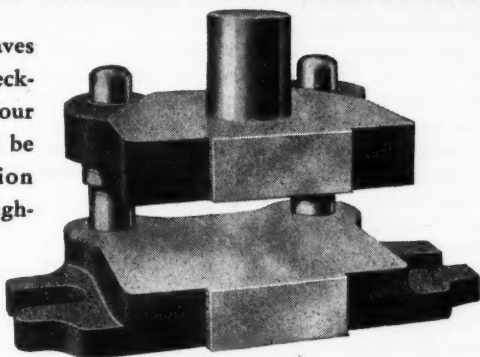
MICHIGAN DRILL HEAD CO.

971 E. 8-Mile Road, Hazel Park, Mich.



CHECKED.. FOR TROUBLE-FREE PRODUCTION

Not a single Die Set ever leaves Producto without a strict check-up of every vital point. Your specifications are orders to be obeyed... your production results will prove our thoroughness.



FROM NEAR-NEIGHBOR POINTS

To save you time, Producto stocks Die-Sets at major tooling centers from coast to coast. Select our nearest assembly and service plant from the list below.

and DOWEL PINS too

Make Producto your source of supply for the close tolerance die maker's accessories you need in a hurry... pins, springs, stripper bolts, screws, adapters, etc. All are neatly packed for easy identification.

THE PRODUCTO MACHINE CO. 960 Housatonic Ave. • Bridgeport 1, Conn.
Bridgeport 4-8481

SEND FOR
CATALOG No. 9



NEAR NEIGHBOR *Service*

INDIANAPOLIS 2,
635 Fulton St.
Lincoln 5385

CLEVELAND 14,
3200 Lakeside Ave.
Prospect 4236

SAN FRANCISCO 7, CAL.
Jamison Steel Corp.
Exbrook 2230

ELMIRA, N. Y.
R. C. Neal Co., Inc.
5168

DETROIT 11,
3017 Medbury
Plaza 3101

LOS ANGELES 21, CAL.
Jamison Steel Corp.
Trinity 9827

BALTIMORE 2, MD.
L. A. Benson Co., Inc.
Plaza 0340

PHILADELPHIA 40, PA.
Wright & Gade Tool Co
Radcliffe 5-1467

NEW YORK 12,
197 Lafayette St.
Worth 4-7484

SYRACUSE 2, N. Y.
R. C. Neal Co., Inc.
3-1181

BUFFALO 2, N. Y.
R. C. Neal Co., Inc.
Cleveland 1110

ROCHESTER 4, N. Y.
R. C. Neal Co., Inc.
Main 5249

down its cupped edge comes in contact with the boss on the workpiece which will bring the piece into proper alignment in the drilling jig.

As the screw bushing is screwed down further, the workpiece is then forced down toward the machined lower face of the jig. This downward motion brings the workpiece in contact with the two springs "B" which are then compressed and thus align themselves to the outline of the workpiece. The springs, therefore, counteract any distortion which might be present in the shape of the stampings. The tension set up on the springs against the surface of the workpiece also assists in holding the workpiece securely during the machining operations.

The two $\frac{3}{8}$ -inch holes and one $\frac{1}{4}$ -inch hole can now be drilled and reamed, the tools being guided in the bushings in the guide plate "A" in the conventional manner. To remove the finish machined workpiece from the drill-

ing jig it is only necessary to unscrew the screw bushing "D" a sufficient distance to enable the piece to be pulled out from beneath the bushing. This fixture is easy and quick to operate and meets the requirements of a drilling jig for pieces on which there are no previous machining operations and when the pieces come to the department in uneven or distorted shapes.

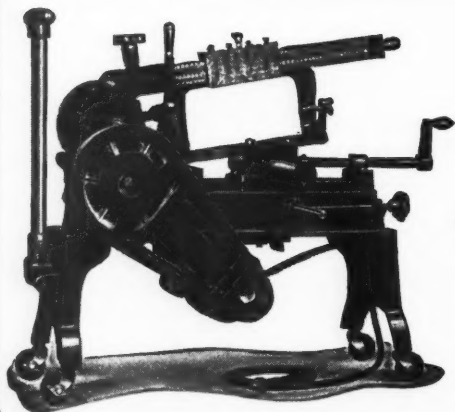
Blocked-Up Press Column Provides More Space for Drilling Operations

By WALTER RUDOLPH

IN the machine shop of the American Sterilizer Company, Erie, Pa., an eight-spindle, sensitive, high-speed Allen drill press has been altered to provide for greater drilling area.

As shown in the illustration here-

SAWMASTER HACK SAW



LOW PRICED

PORTABLE
SELF-CONTAINED

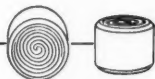
Angle
Cutting
Vise

READY TO WORK
STURDY
ECONOMICAL

*Write for Bulletin
No. 300*

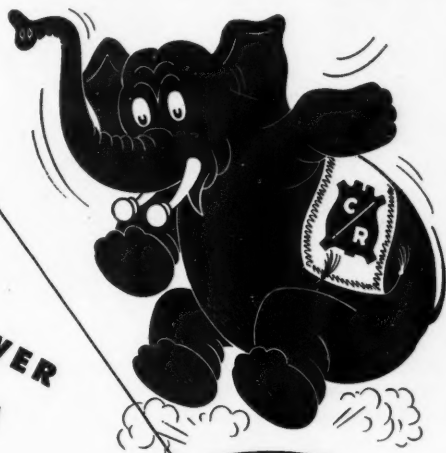
MILLER-KNUTH MFG. CO. OMAHA, NEB.

RAWHIDE gives you *more* in soft hammers and mallets. And *Chicago Rawhide* gives you exceptional power and maximum protection. C/R hammers and mallets absorb shock, deliver powerful blows, protect finished surfaces and stand up under tough use. For hammers and mallets that never split, crumble or mushroom, always ask for *Chicago Rawhide*.



C/R Hammers have malleable iron heads with replaceable coiled rawhide faces.

POWER
PROTECTION
LONG LIFE
DURABILITY
TOUGHNESS
BALANCE

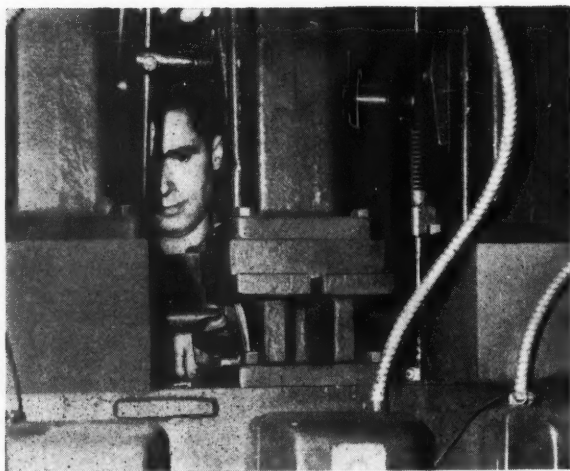


CHICAGO *Rawhide* **MFG.CO.**

1207 ELSTON AVENUE

CHICAGO 22, ILLINOIS

Other C/R maintenance products are: round, flat, twist belting; belt pins and lacing; gears, pinions, gear blanks; aprons, hand leathers; hydraulic packings.



Six-inch Blocks Are Used to Raise Drill Press Column. Center Column in this Illustration is Mounted on Tongue and Groove Block.

with, each of the columns was raised six inches by inserting six-inch steel blocks between the column and the base of the machine. One of the elevat-

The sliding column arrangement is particularly useful when pieces are to be drilled which have a greater radius than can be accommodated by means

ing blocks is worth noting, since it provides for a deeper throat on the drilling machine. This block is grooved and topped by a tongued piece which enables the column to be moved forward and backward a total of $2\frac{1}{2}$ inches across the drilling table.

SPEED for SMALL PART ASSEMBLY

FLOORS slope to feed parts to front—end reaching and fumbling.

Bins taper toward front to form convenient semicircle—keep all bins within easy reach.

Stacking, locking construction for rigid set-ups, easily changed when necessary.

All-welded construction. Smooth, folded edges.

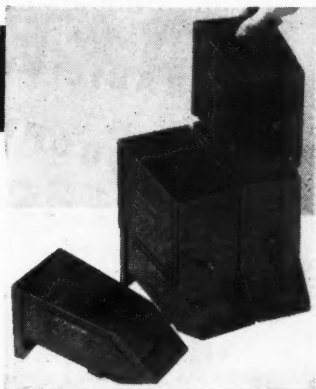
New-design, adjustable hoppers provide increased capacity and permit regulated flow of parts according to sizes and weights.

Two sizes—tapered or straight sides.

PROMPT DELIVERY

Write Stackbin Corporation, 1083 Main St., Pawtucket, R. I.

Manufactured and sold in Canada exclusively by Wickware-Stackbin, Ltd., Ottawa



STACKBIN

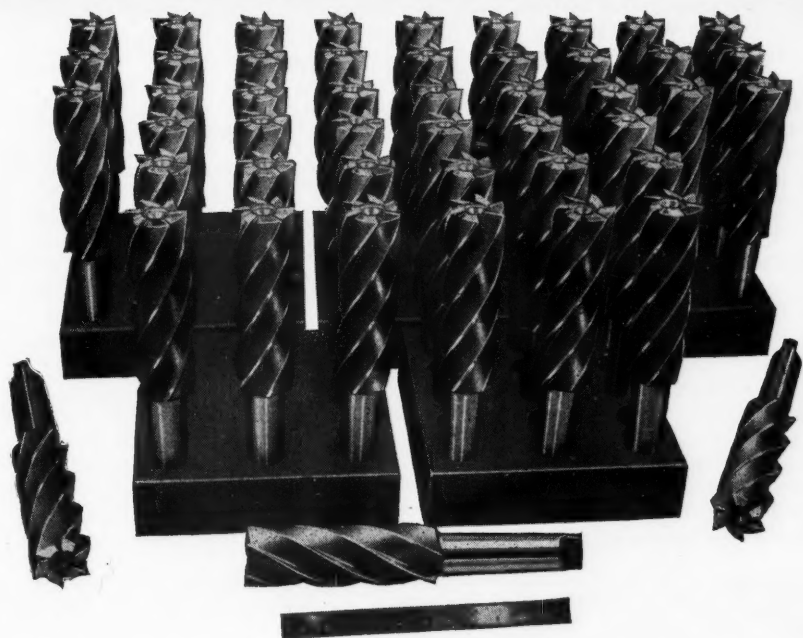
"Stacked and



Still Accessible"

SYSTEM

YESTERDAY'S PIONEER . . . TODAY'S LEADER



HERE'S A SINGLE ORDER—*48 Large Special* **WELDON End Mills**

The 48—*Count'Em!*—48 special large WELDON end mills above represent a single order recently shipped to one of our enthusiastic customers. These are special husky, fast metal-removing WELDON end mills built for sturdy dependable service.

This customer orders in lots like this because he realizes that his profits depend in part on the use of WELDON end mills, noted for their quality, accuracy and fast-cutting performance. *Write for Catalog 8-B.*

THE WELDON TOOL CO.

*Cleveland 4,
Ohio*



3000 WOODHILL ROAD

of the standard column. For example, one drilling operation on a 20-inch sterilizer door required a 10-inch working radius. This door can now be drilled on the larger table area provided by the sliding column arrangement. The operator merely loosens four nuts located on top of the block, slides the column backward, and then tightens the nuts and drills the workpiece.

Device for Centering Milling Machine Cutters

By D. E. McDONALD

IN performing various milling machine operations, it is quite often necessary to "center" a milling cutter in relation to one of the slots on the milling table. For example, it may be necessary to center a cutter in order to mill a keyway or a tang on a workpiece as shown in Fig. 1. The device

described herewith is designed to facilitate setting up the machine to perform such milling operations.

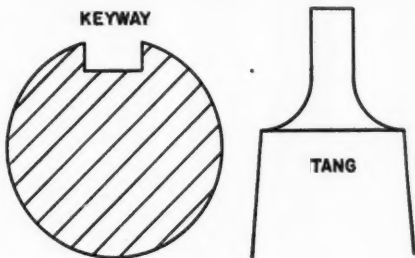
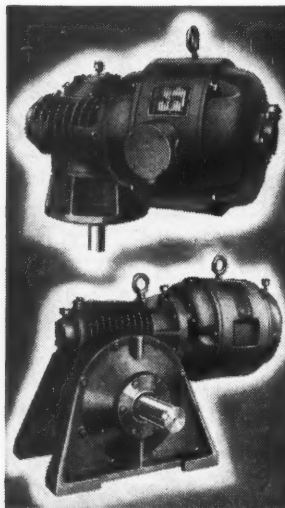


Fig. 1—Milling Operations which Require Centering of Cutter

The centering device consists primarily of two machined steel blocks as shown in Fig. 2. Steel block A which serves as a base for the device is machined to receive the machined and formed block B and is provided with a



1/50 to 7 1/2 H.P.
.08 to 450 R.P.M.

For Obtaining SLOW SPEEDS

Janette Speed Reducers offer these advantages: No jack shafts, pulleys, belts, sprockets, or chains needed. The ratio of speed reduction is positive. Exceptionally low installation cost, because of their compactness. Motors, gears and gear boxes are all Janette built, eliminating divided responsibility for their successful operation. A large number of styles are available to meet various kinds of applications. **Efficient, high speed, low cost motors can be used.** The construction permits easy access to all parts, which results in low cost maintenance.

May We Send You Our Catalog?

Janette Manufacturing Company
556-558 W. Monroe Street Chicago 6, Ill., U. S. A.

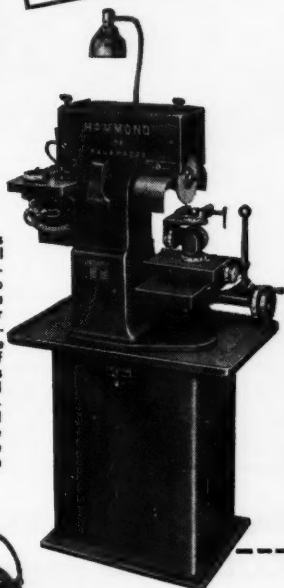
Hammond

OF KALAMAZOO

7", 10", 14"
**CARBIDE TOOL
AND
CHIP BREAKER
GRINDERS**

**MODEL CB-77
CHIP BREAKER AND
DIAMOND FINISHING
GRINDER**

One of several models which combine a universal vise having angular settings for accurate chip breaker grinding, and a cup wheel with angular table adjustments for diamond finish grinding. The CB-77 handles all types of box and single point tools and is adjustable to all angles used in tool grinding. The spindle and all other moving parts are sealed against abrasive dust and protected from excessive wear.



**WRITE FOR
BULLETINS**

**OTHER
HAMMOND PRODUCTS**

- Abrasive Belt Grinders
- General Purpose Grinders
- Polishing Lathes
- Automatic Polishing Mach'y



**MODEL
W-10 WET
CARBIDE GRINDER**

One of four Hammond 10" Wet or Dry Tool Grinder models. All models are equipped with patented Safety Cup Discs which prevent the operator from getting fingers or tool in the center of the wheel. Wet models equipped with No-Spray, No-Splash Coolant System which keeps operator and floor clean and dry. V-belt drive with sealed ball bearings.

Hammond Machinery Builders INC.

1615 DOUGLAS AVENUE • KALAMAZOO 54, MICHIGAN

WRITE
Hammond of
Kalamazoo for
complete information
NO OBLIGATION

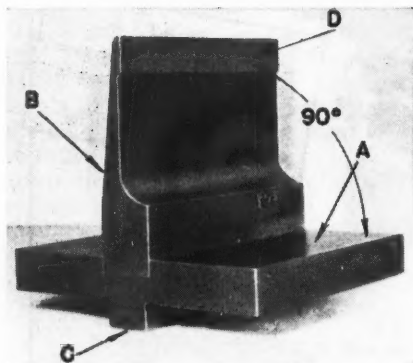


Fig. 2—Illustration of a Device for Use in Centering Milling Machine Cutters

tongue C. This tongue is machined so that its width will correspond to the width of a milling machine table slot. Block B is fastened to block A by means of three set screws. The surface on block B, designated as D, is harden-

ed and ground. In fastening the two blocks together, surface D must be positioned at a 90-deg. angle with relation to block B and in line with the center line of tongue C.

Operation

Assuming that a one-inch keyway is to be cut in a shaft, in all probability the shaft will be held in two V-blocks which engage the milling machine table slot. Either before or after the shaft has been placed on the table, the centering device is placed in the milling machine table slot, and the table is adjusted so that the face of the cutter comes in contact with surface D as shown in Fig. 3. This means that the face of the cutter is in the center of the milling machine table slot. Further, assuming the milling machine cutter to be one inch wide, the only adjustment that remains to centralize the cutter is to remove the centering

SMALL • EFFICIENT • INEXPENSIVE • PRACTICAL

DUCON UNIT-TYPE DUST COLLECTOR for dust control at machines

Dust is a serious health hazard and wears out machinery bearings needlessly. DUCON solves these problems by stopping all the dust.

Compactness is combined with efficiency in DUCON design which features multiple numbers of cloth filter bags to provide maximum filter area to air flow.

Filter bags readily cleaned by positive shaker and the dust thus dislodged drops to and accumulates in receptacle pan at bottom of unit. DUCON cloth filter bags last indefinitely providing low cost dust control without constant maintenance.

Complete information given in Bulletin No. 249. Ask for your copy.

THE DUCON COMPANY

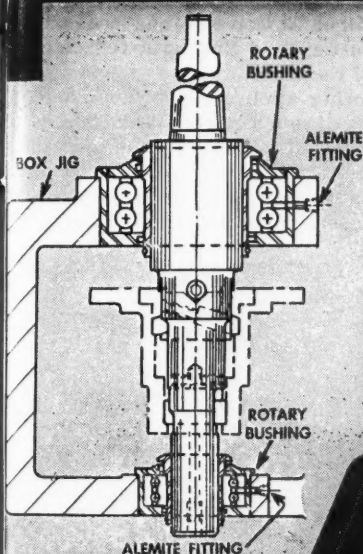
Air and Gas Washers—Cyclones
—Dust Control Systems
147 EAST 2ND ST.
MINEOLA, L. I., NEW YORK



DUCON Unit showing filter bag arrangement.
Capacities 200-800 Cubic Feet of Air per minute—four standard sizes.

wo
be
la-
the

y is
ity
eks
ta-
the
the
ill-
ble
ut-
D
nat
ter
ur-
ine
nly
ize
ng



**SEALED
PRECISION
BALL BEARING
CONSTRUCTION**



GATCO

ROTARY BUSHINGS

**FOR DRILLING, CORE DRILLING,
ROUGH AND FINISHED BORING**

The inner race of the GATCO bushing rotates with the tool, piloting the tool accurately below or above the work—or both.

Eliminates expensive tool construction—Reduces tool wear—Prevents seizure and pilot breakage—Especially adapted where precision is required.

Write for full information and prices

GIERN & ANHOLTT TOOL CO.
1304 Mt. Elliott Avenue • Detroit 7, Michigan



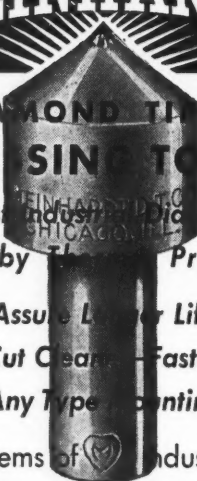
ELK
**UNIVERSAL
PRECISION
TOOL
HOLDER**

**REPLACES...
10 SINGLE-PURPOSE
TOOL HOLDERS**

Round boring bars and internal threading tools can be used in the same tool holders.

Write for Bulletin

ELK TOOLS, Inc.
71 West Broadway New York 7, N. Y.



MEINHARDT

**DIAMOND TIPPED
DRESSING TOOLS**

*Finest Industrial Diamonds
Set by the Process*

**Assure Longer Life
Cut Cleaner—Faster
Any Type Grinding**

Gems of Industry

MEINHARDT DIAMOND TOOL CO.
2810 Milwaukee Ave. Chicago 18, Ill.

device and adjust the table inward 0.500 inch. After this has been done, the cutter is in line with the centerline of the shaft.

Another application is found in the cutting of tangs. Assume that the same one-inch cutter is used, and also that the cutter has been brought to bear against the centering device surface D. Also assume the width of the tang to

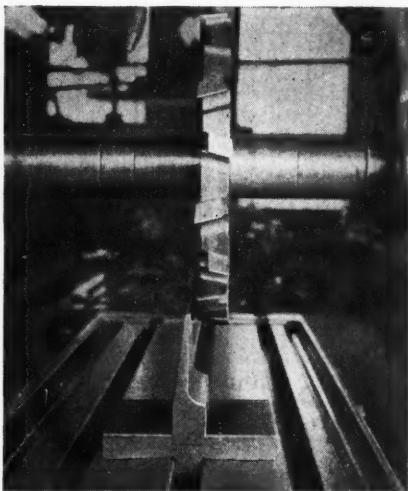


Fig. 3—Milling Machine Cutter Centering Device in Use

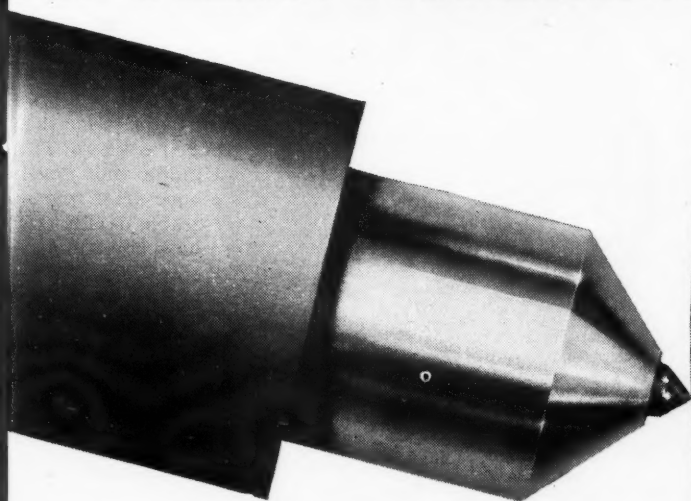
be one-half inch. The remaining adjustments to be made are as follows: The table must be moved outward a distance of 0.250 inch to machine the first side. After this side has been machined the table is moved inward 1.500 inch, and in this position the other surface may be machined.

If, however, the tang is to be machined by using two cutters in order to machine both surfaces at once, and provided the space in between the cutters is correct, the only adjustment necessary after the inside face of the inside cutter has been set to the center of the milling machine table slot,

ward
done,
inter-

the
same
that
bear
ce D.
g to

For Utmost Precision...



Use Desmond Diamond Tools

THE PLAIN FACT that Desmond makes the only complete line of grinding wheel dressing and truing tools is reason enough for specifying Desmond for all your dressing requirements. But there are other good reasons, too. Take diamond tools. We select rough diamonds with expert care, mount them (in hand tools or nibs) with hard-earned know-how, and *stand behind every single one.*

Fasten your Desmond diamond tools securely in the tool post or holder . . . with

the tool axis at an angle of 10 to 15 degrees with respect to the radius . . . and turn the tool frequently to present a new diamond point. As a rule large diamonds run cooler and *do more work per dollar* than small ones.

Write for your copy of the Desmond Catalog No. 45 today. It will help you pick the right tool for the job—and get the most out of it.

The Desmond-Stephan Mfg. Co., Urbana, Ohio

Desmond

the only complete line of grinding wheel

DRESSERS & CUTTERS



BALL BEARING DRESSERS



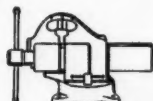
REVOLVING CUTTER TYPE DRESSERS



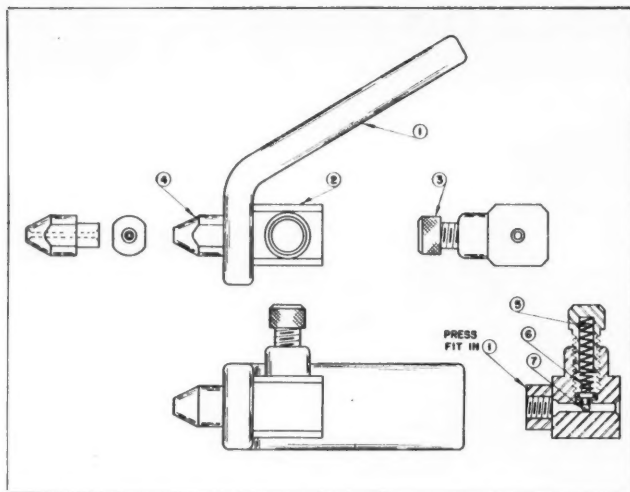
DIAMOND HAND TOOLS AND NIBS



WHEEL TYPE DRESSERS



SIMPLEX STEEL-SLIDE VISES



Tool Post Wire Guide

the tool post wire guide described herewith. This guide was developed after considerable difficulty had been experienced in attempting to make use of makeshift blocks which had been located in the lathe toolpost as guides. By the previously used method, the wire

would be to move the table outward an amount of 0.250 inch.

This device can also be used to advantage on shaping and planing operations for the purpose of locating the position of cutting tools.

frequently became snarled or snapped in two as it was being coiled. The guide shown in the accompanying illustration not only permits the wire to be guided evenly onto a mandrel but also provides tension on the wire at all times.

The holder of the guide is shown at (1). This piece may be made of low-cost, mild steel. (2) is the guide body which is made of heat-treated steel, such as 3140. The hole for the guide body is a No. 31 D. (3) is a spring retainer, tension-adjusting screw. (4) is a feed button which is made of tool steel. Three feed buttons can be used

Tool Post Wire Guide

By BERT CHARLESWORTH

MANY small shops and tool rooms that are frequently called upon to repair or wind special purpose coil springs will find considerable use for



Your Shop Needs BOTH Machines

← The MILWAUKEE Die Filer

... for sawing, filing and lapping of straight lines, sharp corners and flat surfaces.

The MILWAUKEE Profile Grinder →

... for high speed precision grinding of curved and irregular contours.



Milwaukee

CHAPLET & MFG. CO.

1041 S. 40th ST., MILWAUKEE 4, WIS.

Write for
Bulletins

wire
ribbed
This
level-
nsid-
ulty
peri-
mpt-
use
if t
had
in
post
the
sed
wire
pped
The
g il-
wire
drel
wire

n at
low-
body
teel,
uide
re-
t) is
tool
used

e for
otins

1948



the world is waiting...



... for your products.

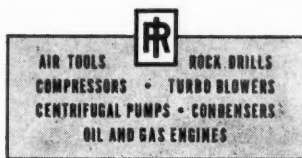
To speed up your assembly lines, to accelerate your fast repetitive operations—use lightweight, powerful Ingersoll-Rand Air Tools...

Drills... Grinders... Chipping Hammers... Impact Wrenches... Riveters

...Air Motors... Diggers... Air Hoists... Vibrators... Sanders...

Pumps... Rammers... Screwdrivers, etc.

Phone our nearest branch office for a demonstration.



Ingersoll-Rand

11 Broadway, New York 4, N. Y.

62-8

January, 1948

MODERN MACHINE SHOP 215

BUTTERFIELD THRED-RITE DIES

The modern adjustable collet die at its best.

Engineered to meet the demand for screw thread parts production on high speed equipment.



These dies can be used not only in our own Floating and Releasing Type Holders but also in any Holder designed for dies of this type.

For accuracy, speed and long life specify Thred-Rite.

UNION TWIST DRILL CO. BUTTERFIELD DIVISION

Factories: Derby Line, Vermont, U.S.A.
Athol, Mass.; Mansfield, Mass.;
Rock Island, Quebec, Can.

STORES:

| | |
|----------------|--------------------|
| Cleveland..... | 2902 Euclid Ave. |
| Chicago..... | 11 S. Clinton St. |
| Detroit..... | 5527 Woodward Ave. |
| New York..... | 61 Reade St. |
| Toledo..... | 3636 Detroit Ave. |

on this guide body having the following size holes: Nos. 31, 42 and 55. (5) is a coil spring of approximately No. 60 G. (6) is a concave ball button. (7) is a $\frac{1}{8}$ -inch standard ball.

Since this guide was made and put into use, several others of various sizes were made and proved equally satisfactory in operation. The size of guide described here should accommodate at least 90 per cent of the average shop's requirements.

Bullard "Cut Master" Vertical Turret Lathe is the subject of a wire-bound catalog published by The Bullard Co., Bridgeport 2, Conn. The catalog begins with colored illustrations and descriptions of the machine and its various features, including spindle and bearings, spindle drive and headstock mechanism, spindle lubrication, tables, chucks, main rail, saddle and swivels, turret head and turret, side head, ram head, feed mechanism, headstock, and so on. A table listing standard tool equipment for the various sizes in which the machine is available is included.

The second section of the catalog illustrates and describes the use of Bullard vertical turret lathes in machining a variety of products in the toolroom. The final section of the catalog presents complete specifications on the 30, 36, 42, 54, 64, and 74-inch sizes in which the Cut Master is available.

Copy of the catalog is available free to mechanical executives addressing requests on their company letterheads.

Fafnir Super-Precision Ball Bearings. The Fafnir Bearing Co., New Britain, Conn., now has available a catalog on super-precision ball bearings made to ABEC 7 tolerances, with special emphasis given to their use in spindles, work heads, boring heads, live centers, and so on. The catalog contains general information on mounting, preloading, lubrication, and so on, together with dimensions and load ratings of the various sizes manufactured in the extra light, light, medium, duplex, and extra small series. In addition, the catalog contains detailed drawings of actual assemblies utilizing super-precision ball bearings. Copy free upon request.

ow-
(5)
No.
(7)

out
zes
is-
ide
at
p's

ret
at-
o.,
ins
ip-
ea-
gs,
m,
ain
nd
ch-
st-
ar-
il-

s-
rd
ar-
al
ete
nd
is

to
re-

rs.
n,
on
to
a-
rk
so
r-
a-
ns
es
t,
s.
il-
z-
oy

THE CLEVELAND PUNCH & SHEAR WORKS COY.

PUNCHES

| Fig. | Diameter | Fig. | Diameter |
|------|----------------|------|--------------|
| 2 | 1/2" to 1 1/2" | 11 | 1 1/2" to 2" |
| 3 | 1 1/2" to 2" | 12 | 2" to 2 1/2" |
| 4 | 2" to 2 1/2" | 13 | 2 1/2" to 3" |
| 5 | 2 1/2" to 3" | 14 | 3" to 3 1/2" |
| 6 | 3" to 3 1/2" | 15 | 3 1/2" to 4" |
| 7 | 3 1/2" to 4" | 16 | 4" to 4 1/2" |
| 8 | 4" to 4 1/2" | 17 | 4 1/2" to 5" |
| 9 | 4 1/2" to 5" | 18 | 5" to 5 1/2" |
| 10 | 5" to 5 1/2" | 19 | 5 1/2" to 6" |
| | | 20 | 6" to 6 1/2" |

Page (on)

CLEVELAND, OHIO, U. S. A.

**TAKE THIS PUNCH
FOR EXAMPLE—
WE STOCK IT IN 29
PUNCHING DIAMETERS**

*Write for Small Tool
Hand Book*

and as this is but one of our twenty-one standards you can imagine the enormous quantity of Punches carried in stock to meet immediate demands. Besides, for each standard Punch there is a standard Die, consequently our stock of Dies is as varied as our stock of Punches.

WE MAKE PUNCHES AND DIES FOR ALL THE SHAPES SHOWN

Small Tools THE CLEVELAND PUNCH & SHEAR WORKS COMPANY *Cleveland, Ohio*
 NEW YORK • CHICAGO • DETROIT • PHILADELPHIA • PITTSBURGH

News of the Industry

Parker-Prentiss Vises Combine

Parker B. Allen, president of The Charles Parker Company, recently announced the merger of America's two oldest vise manufacturers, Parker Vises 1832 and Prentiss Vises 1856, effective January, 1948.

While both lines will be manufactured at the main plant in Meriden, Conn., sales will be handled independently. The Prentiss sales force will continue to sell Prentiss Vises and the Parker sales force will continue to sell Parker Vises.

Yoder Announces Opening of New Die Casting Plant

Mr. C. H. Nelson, Executive Vice President of Yoder Die Casting, Inc., Dayton, Ohio, announces the opening of their new plant at 727 Kiser Street. This addition to Yoder aluminum and zinc die casting facilities marks the fourth consecutive year of growth and expansion of this industrial concern, formed by Edison K. Yoder, President, during the war in a small plant on Wayne Avenue after twenty years experience with other concerns in the die casting business.

One of the most interesting developments of Yoder Die Casting has been the special machinery designed and built by Mr. Yoder to speed production of fine castings and used exclusively in their own plant. Prompt delivery on small cast-

ings up to two pounds has been a specialty with Yoder, and the company has maintained contracts with leading manufacturers all over the country including leading aircraft parts manufacturers where precision casting is imperative.

Carborundum Company Acquires New Plant

The Carborundum Company, Niagara Falls, N. Y., recently received from the New York office of the War Assets Administration preliminary notification that its bid of \$1,000,000 for a part of Plancor 168, formerly operated by Bell Aircraft Corp., has been accepted. The portion of the property thus acquired was released by the Bell Aircraft Corp. from its general option in May as being additional facilities not required in their programs for the future.

The property sold to The Carborundum Company comprises approximately 65 acres. It is located at the northeast corner of the original Bell property fronting on Walmore Road. This property has been acquired primarily as manufacturing space for the coated products division of The Carborundum Company. Extensive renovation is planned to start immediately in conformity with engineering programs already completed, to be made effective when and if the bid was accepted by the government.



View of New Yoder Die Casting Plant



YOU CAN'T BEAT IT
FOR LIGHT MILLING OPERATIONS

Bellows AIR VISE

Small, powerful (clamping pressures from a fraction of a pound to 500 lbs. or more) the Bellows CV40-B Air-operated Vise is the ideal holding unit for light milling, drilling, tapping, reaming, and other machine operations.

Jaw width is 4" with the jaw opening adjustable up to 2 1/4". Removable soft

steel false jaws can be milled to almost any shape.

The integral valve, with operating lever and speed controls built-in, permits hand or foot operation, or ready synchronization to the machine movement.

Write for Bulletin CV40-BM

The Bellows Co.
861 E. TALLMADGE AVENUE
AKRON 10, OHIO

Sintercast Corporation Organized

A new corporation devoted to consultation, research and development in the field of powder metallurgy, Sintercast Corporation of America, New York, N. Y., has been formed by Erwin Loewy, president of Hydropress, Inc., and two associates, Dr. Claus G. Goetzel and John Ellis. The new organization offers to industry a means of applying the latest techniques and newest developments in the rapidly-complicating field of powder metal parts production. Sintercast is currently establishing complete research and pilot-production facilities, so that it can carry clients' projects through laboratory development to full-scale production.

Mr. Loewy, president of the new group, is well known both here and abroad in the heavy hydraulic-press and metal-working-machinery fields, and heads up companies which in the past 25 years have made important contribution to both non-ferrous and ferrous extrusion, forging and rolling, and die casting processes. Dr. Goetzel, vice president and director of research, has worked and written profusely in the fields of powder metallurgy and infiltration technology. He originated and still directs the powder metallurgy courses at New York University and was former-

ly associated as technical director with American Electro Metal Corp. Mr. Ellis, chief engineer, has specialized for many years in the equipment-design, production - procedure and sales - engineering phases of powder metal parts production. He has formerly been on the staffs of both Hydropress and American Electro Metal Corporation.

Arseneau-Price Company Formed

The Arseneau-Price Company, Detroit, Mich., has announced its entry into the field of manufacture of a complete line of standard straight shank chucking reamers, straight and spiral flute from $\frac{1}{8}$ inch to $\frac{1}{2}$ inch diameter inclusive. This company will also manufacture special reamers, end mills, milling cutters and counterbores of $\frac{1}{2}$ inch diameter or less. The Arseneau-Price Company has engineered and built a new type of machine for the production of standard and special tools. All such tools whether standard or special are manufactured of 18-4-1 steel, and heat treated by the electric salt bath method. The highest standard of workmanship and precision tolerance is maintained.

For EASY Adjustment

Specify

COMPACT DESIGN

HIGH TORQUE

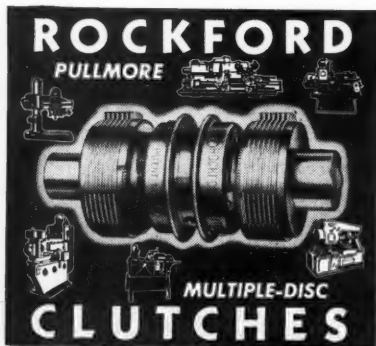
HIGH-RATIO LEVERS

POSITIVE NEUTRAL

PRECISION BUILT

LONG WEAR LIFE

EASY ADJUSTMENT



One-point adjustment, by hand, of ROCKFORD Multiple-Disc CLUTCHES is simple, easy and ample to maintain uniform operating conditions under long, hard usage. Unaffected by centrifugal force, PULLMORE clutches are convenient to operate and are positive in driving, braking and neutral action.

Send for This Handy Bulletin

Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications.



ROCKFORD CLUTCH DIVISION

BORG-WARNER

300 Catherine Street, Rockford, Illinois, U. S. A.

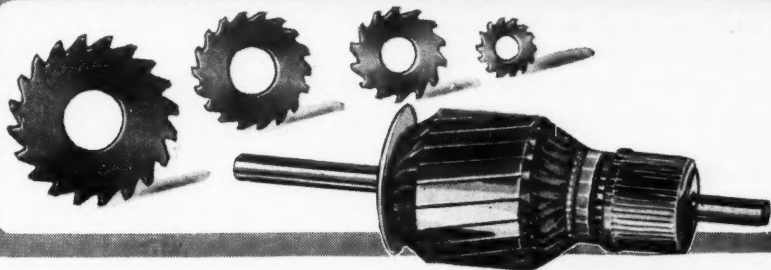
Pullmore Clutches are sold by Morse Chain Co., offices in principal cities

CIRCLE®

Solid Tungsten Carbide

COMMUTATOR SLOTING SAWS

"U" Type



INCREASE PRODUCTION

25 to 80 TIMES over High Speed Steel Saws

Commutator slotting saws are made in diameters from $\frac{3}{16}$ " to $1\frac{1}{8}$ ", and from .010" to .045" thick. They operate at 5,000 to 6,000 R.P.M. and assure better work at these greater speeds! Complete price information available on request.

CIRCULAR TOOL CO., INC.

PROVIDENCE 5, R. I.

CHICAGO • PHILADELPHIA • NEW YORK • DAYTON • CLEVELAND • DETROIT
ST. LOUIS • MINNEAPOLIS • LOS ANGELES • ROCHESTER • INDIANAPOLIS

Buy KIPP AIR GRINDERS Because

The RPM's stay up while grinding ... not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind — not just rub. The speed of Kipp air grinders drops but slightly when put to work. That means better work—longer wheel life.

Buy Kipp air tools for best results, lower prices.

MODEL JA
50,000 R. P. M.

\$42⁰⁰

IN U. S. A.



Weight 12 ounces;
length 6¾ inches;
chuck size ⅝ inch.
Wheel guard re-
moved for better
illustration.

MADISON-KIPP CORP.

208 Waubesa St., Madison, Wis., U. S. A.

- Skilled in DIE CASTING Mechanics
- Experienced in LUBRICATION Engineering
- Originators of Really High Speed AIR TOOLS

Certain territories for the distribution of tools manufactured by this company are available to manufacturers' representatives. Inquiries in this respect should be addressed to the Arseneau-Price Company, 10840 E. Warren Ave., Detroit 13, Michigan.

Eighteenth Annual Safety Convention

The 18th annual Safety Convention and Exposition of the Greater New York Safety Council will be held April 13 through 16 in the Hotel Pennsylvania, New York, N. Y. The event, which draws safety experts, law enforcement officials and educators from all parts of the nation, had an attendance of more than 8,000 at its 1947 sessions.

Edward A. Fullarton of Queens Village, N. Y., is general chairman for the convention. Mr. Fullarton is senior engineer of the Travelers Insurance Company.

Index Machine to Represent Index Machine and Tool Company

Effective January 1, 1948, the newly formed Index Machine Company, Jackson, Mich., will become the sales representative for the Index Machine and Tool Company of the same city. The new firm will handle the complete line of index milling machines and related equipment formerly sold through Blank and Buxton Machinery Company.

The Index line includes Index milling machines, precision rotary tables, angle milling attachments, jig boring rods and indicators.

Sales Representative in India

The Bakhshi Ram & Co., 46 Basti Harphool Singh, Saddar Bazar, Delhi, India, is now offering exclusive sales representation in India to American manufacturers. This firm is interested in representing American manufacturers of builders' hardware, tools, machines, rubber belting, hair belting, belt fasteners, iron and steel products, grinding wheels, bolts and nuts, screws, butt hinges, nails, wire screens, and brass products.

Mention MODERN MACHINE SHOP when writing to advertisers.



Barker Two-Jaw or Three-Jaw **WRENCHLESS CHUCK**

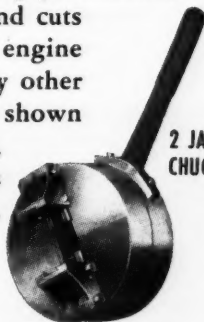
will pay for itself in 60 to 90 days on production schedules by giving MORE parts per hour at a LOWER cost per part. Most round parts can be set in the Barker Wrenchless Chuck without stopping the machine. It saves time, helps speed up production, is simple to operate, reduces operator fatigue and cuts spoilage where the run is continuous on turrets, engine lathes, cutting off machines, drill presses or any other type of chucking machine. The Barker Chuck shown above, replacing an ordinary 3-jaw chuck, jumped production from 18 to 24 pieces per hour. It can do it in *your* plant too. Let us show you how!

**3 JAW
CHUCK**



Write for bulletin 201 today.

**2 JAW
CHUCK**



Chuck Division
THOMAS HOIST CO.
28 S. HOYNE CHICAGO 12



1st Vice President
LLOYD D. McDONALD
 Vice President, The Warner
 & Swasey Co.



President
ALEXANDER G. BRYANT
 Vice President, Cleereman
 Machine Tool Co.



2nd Vice President
DAVID AYR
 President, Hendy
 Machine Company



Director
M. A. HOLLENGREEN
 Exec. Vice President
 Landis Tool Company

NEWLY ELECTED
 OFFICERS and
 DIRECTORS
 OF THE
 NATIONAL MACHINE
 TOOL BUILDERS'
 ASSOCIATION



Director
HAROLD B. SMITH
 President, Illinois
 Tool Works



Treasurer
LOUIS POLK
 President, The Sheffield
 Corp.



General Manager
TELL BERNA



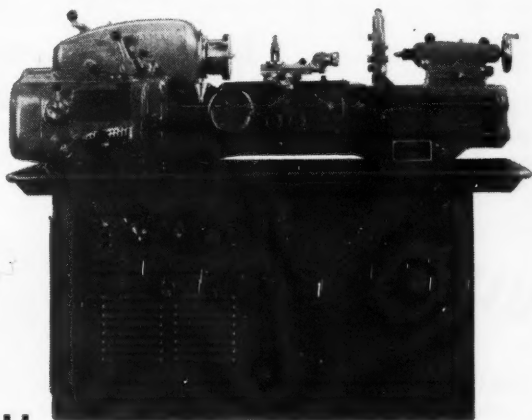
Secretary
FRIDA F. SELBERT

THE NEW HENDEY 9"x24"

TOOL AND GAGE MAKER'S LATHE

GIVES YOU THESE LONG-WANTED FEATURES

- | | |
|-------------------------------|---|
| 1. <i>Greater Capacity</i> | 1½" maximum capacity of Spring Collets. |
| 2. <i>Finer Control</i> | 66 different feeds, 66 different threads without gear change. |
| 3. <i>Higher Speed</i> | Up to 2000 r.p.m. forward and reverse. |
| 4. <i>Greater Sensitivity</i> | Stepless speed over entire range provided by DC power unit. |



AND MORE...

To insure precise production the new Hendey 9"x24" has these additional features. Hardened and ground spindle runs in super precision, preloaded, anti-friction bearings. The lead screw is held to .0005" per foot of lead and is used only for thread cutting. A separate feed rod, independent of the lead screw, is provided. Lubrication is automatic throughout.

The new Hendey 9"x24" is the precision lathe that fulfills a long standing desire of tool and gage makers everywhere. Full information on this highly accurate, sensitive and versatile lathe, is contained in the new 9" x 24" catalog—send for it today.

The Hendey Machine Company

Main Office and Plant — Torrington, Connecticut

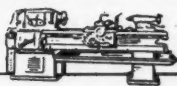
Offices — N. Y., Chicago, Boston, Detroit, Rochester, Los Angeles, San Francisco

Representatives in — Philadelphia, Cleveland, Pittsburgh

Hendey

TOOL ROOM LATHES

12" - 14" - 16" - 18" - 20"



SHAPERS

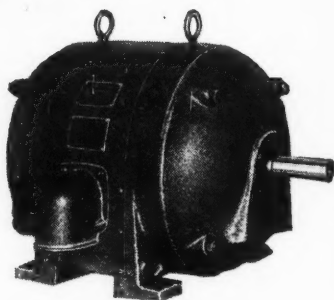
12" - 14" - 20"



don't buy a motor you
 ...buy one you can

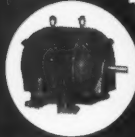
Swear at
 Swear by

Original Equipment Manufacturers and other users alike "swear by... and not at LIMA motors". Type RS (rugged service) illustrated, is built for heavy-duty Industrial applications. It is of semi-enclosed, drip-proof construction and is available for quick delivery in standard NEMA frame sizes.



Also available are Special Motors...Rotors and Stators for Poly-phase operations. 25, 50 and 60 cycle, 220/440v AC.

Write For Bulletins



THE LIMA ELECTRIC MOTOR CO.


168 FINDLAY ROAD

LIMA, OHIO

REPRESENTATION IN MOST PRINCIPAL CITIES

LIMA GEARSHIFT DRIVES

LIMA PEDESTAL GRINDERS - LIMA ELECTRIC MOTORS



GUARANTEED WATERPROOF
FOR WET OR DRY GRINDING
•
MAXIMUM HOLDING POWER
•
LONG LIFE CONSTRUCTION
•
FOR OPERATION ON
110 OR 220-VOLT D.C.

L-W MAGNETIC CHUCKS

5 1/4" x 13"

\$47.65

6 1/4" x 18"

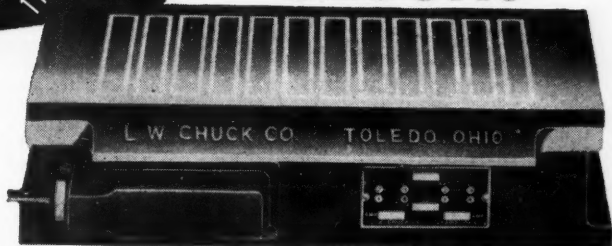
\$63.15

8" x 24"

\$109.30

10 3/4" x 37"

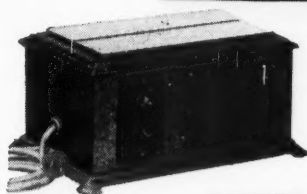
\$202.05



DEMAGNETIZERS

A single pass over the stationary poles is sufficient to completely demagnetize work that has become magnetized through induction. Model B-2 for large work, complete with pilot light signal, switch and cord. Operates on 110 volts A.C. current. 7 1/4" wide, 12 1/2" long, 6 1/4" high. Shipping weight 55 lbs. **\$63.20**

Model J-1 for small work, complete with switch and cord. 7 1/4" wide, 7 1/4" long, 6 1/4" high. Shipping weight 35 lbs. **\$41.15**



RECTIFIERS

For converting A.C. into D.C. for use on magnetic chucks. A.C. input 110 volts. D.C. output 110 volts. For continuous duty and long life. P-1 for 5 1/4" x 13" chuck 0.8 amps., **\$38.75**. P-2 for 6 1/4" x 18" chuck 1.0 amps., **\$45.00**. P-3 for 8" x 24", 10 3/4" x 37" chuck 3.0 amps. **\$60.00**.



DEMAGNETIZING SWITCHES

for use on our 5 1/4" x 13" and 6 1/4" x 18" sizes. When the switch is thrown to "ON" position, the chuck is magnetized, and the work held firmly for grinding. When the work is to be released, the switch is thrown to "DEMAQ" and contacts are touched momentarily to neutralize the chuck. **\$8.90**



Field discharge type for 8" x 24" and 10 3/4" x 37" **\$16.25**

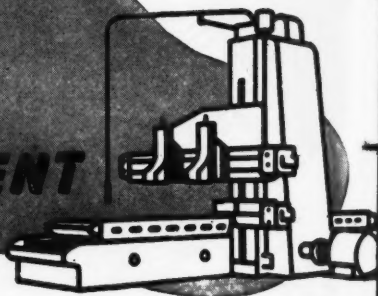
Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



L-W CHUCK COMPANY

28 SO. ST. CLAIR ST.
TOLEDO 4, OHIO

NEW SHOP EQUIPMENT



LeMaire Automatic Index Trunnion Machine

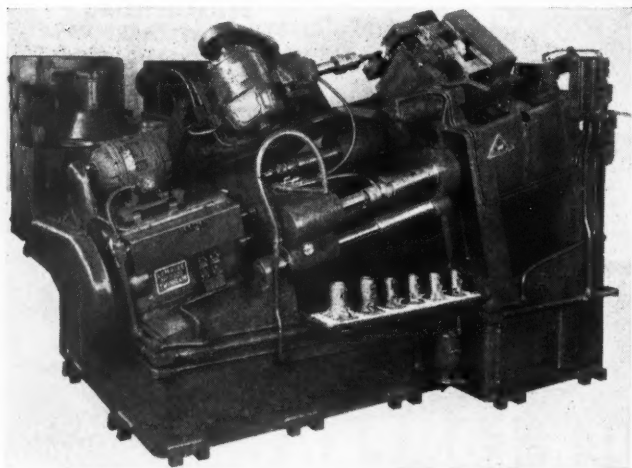
The accompanying illustration shows a single end 5-station automatic index trunnion machine especially designed for boring hydraulic jack bodies which have been brought out by the LeMaire Tool & Manufacturing Co., 2657 S. Telegraph Rd., Dearborn, Mich. The machine consists of a rigid fabricated base which houses a coolant system and supports the trunnion index mechanism.

A LeMaire No. 5000 twin ram self-contained hydraulic drill unit with a 3-spindle boring head is mounted on the left end of the machine. A LeMaire No. 150 master lead screw tapping unit

mounted on a hydraulically-actuated sub-slide is positioned at Station No. 5. The drill and tapping units are powered by variable speed motors. The trunnion is a 5-station automatic index unit. The fixtures are of the hydraulically-operated self-centering vise type and are clamped and unclamped by air cylinders mounted on the trunnion support at Station No. 1.

In operation, the jack bodies are loaded and unloaded at Station No. 1 of the machine. At Station No. 2, a $2\frac{1}{8}$ -inch hole is rough bored through the body, which is then machined with a $\frac{1}{8}$ -inch x 45-deg. chamfer. The $4\frac{1}{2}$ -inch diameter of the body is next rough faced and then rough counterbored $4\frac{1}{8}$ inches plus 0.002 inch and minus 0.000 inch. At Station No. 3,

the $4\frac{1}{2}$ -inch diameter of the part is finish faced. At Station No. 4, the $2\frac{1}{8}$ -inch diameter hole through the part is finish bored, as is the 4.1875-inch (plus 0.002 inch and minus 0.000 inch) counterbore. A $2\frac{1}{2}$ -inch 20-thread tapping operation is performed at Station No. 5. The machine is said to have a production of approximately 150 pieces per hour.



LeMaire Automatic Index Trunnion Machine

SAW WITH
Starrett
 HACKSAWS and BAND SAWS
 for
 MORE CUTS PER DAY
 MORE CUTS PER SAW

PRECISION MADE BY THE
 WORLD'S GREATEST MAKERS
 OF PRECISION TOOLS

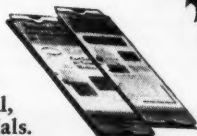
Buy Through
 Your Distributor

STARRETT

TO GET THE MOST OUT OF HACKSAWS AND BAND SAWS

Starrett Hacksaw Booklet
 "MD" describes the complete
 line of Starrett Hacksaw
 Blades for hand frame and
 hacksaw machine and Starrett
 Band Saws for cutting metal,
 wood and other materials.

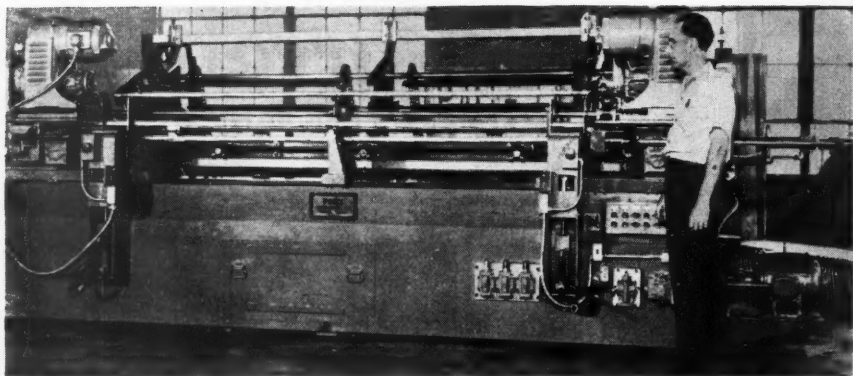
Starrett Cutting Chart in-
 stantly gives complete infor-
 mation for cutting any mate-
 rial by hacksaw or band saw.
 Write for copies.



THE L. S. STARRETT CO. • ATHOL • MASSACHUSETTS • U. S. A.
 World's Greatest Toolmakers

STARRETT

PRECISION TOOLS • DIAL INDICATORS • STEEL TAPES • GROUND FLAT STOCK
 HACKSAWS • BAND SAWS FOR CUTTING METAL, WOOD, PLASTICS



Pines Automatic Profiling Machine

The construction of the LeMaire Automatic Index Trunnion Machine is such that the part is machined in an angular position to eliminate chip pockets. Ample coolant is provided, the coolant being arranged to flow through the center of all cutting tools and taps. Variable speed motors provide for infinite control of spindle speeds so that a constant cutting speed can be maintained for all parts produced.

Pines Automatic Profiling Machine

A general duty automatic profiling machine for high production end-machining operations has been developed by the Pines Engineering Co., Inc., 642 Walnut St., Aurora, Ill. The machine can be used for turning, boring, chamfering, burring, threading, tapping, and other operations

on the ends of pipe, tubing, bars, fittings, and so on.

The Pines Profiler can be built for either manual or fully automatic operation. The automatic unit is equipped with hydraulic controls which are arranged to repeat the machining sequence continually. With the work hydraulically chucked, one or both ends are machined by the action of rotating heads, which hold the cutters. Either one or two heads may be employed on the machine, which may be set up to handle various lengths and diameters of work. The machine may be equipped with a chute or magazine feed for maximum lengths of work up to 24 inches. For work over 24 inches long, a reel feed is available.

When desired, the Pines Profiler can be equipped with an automatic conveyor for transporting the work to the machine and conveying the finished pieces to a convenient point of storage or to areas where further processing is performed.

LUERS

PATENTED CUTTING OFF TOOL HOLDERS PATENTED CUTTING OFF BLADES

ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

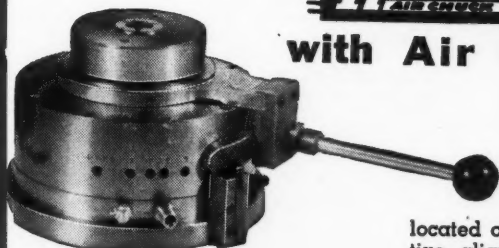
Manufactured by

J. MILTON LUERS, 12 Pine Street, Mt. Clemens, Mich.

Produced under License Issued by John Milton Luers Patents Inc.

"Air Devices by Redmer"

Redmer Index Chuck with Air Operated Collet



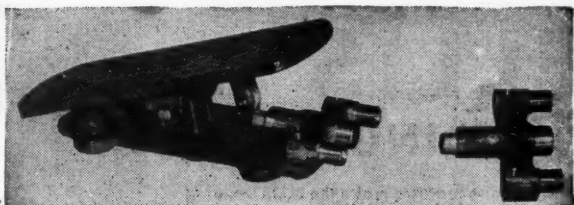
RC-5

Eliminates removing chuck from base of machine for changing index position. Index screw posts located on OUTSIDE of chuck. Provides positive alignment and depth control by using stationary type collets. Capacity 1/16" to 2".



Air Foot Control and Valve

Designed to make its operation as tireless as possible. Opening and closing of plunger of valve on foot pedal is operated by a roller on pedal casting which relieves wear on plunger and facilitates operation. Valve is a brass casting which will take plenty of abuse and can be removed from the foot control and used as a separate unit in connection with cam operations.



No. FC-28

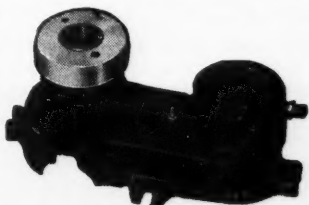
V-29



Collet Air Chuck

An air operated collet holding fixture using same type collets as Brown & Sharpe automatic screw machines. For drilling, milling, threading, etc., also for assembly work. Six models, No. 00, No. 10, No. 0, No. 2, No. 2 Special, No. 4, Collet Capacity 1/16" to 3 1/2". AVAILABLE WITH AIR EJECTION OR OIL FLUSHING.

Write for literature and prices



REDMER AIR DEVICES CORP.

9132 W. BELMONT AVENUE, FRANKLIN PARK, ILL.



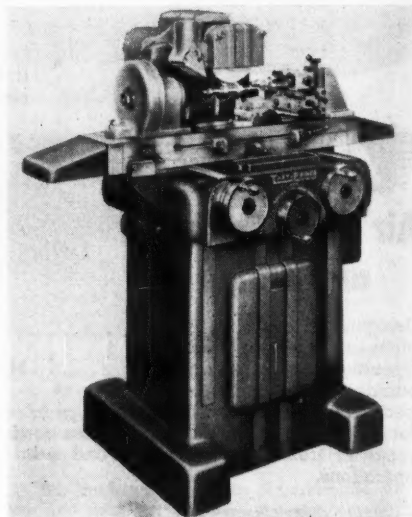
THE ELLIS DIVIDING HEAD

Many unique features make the ELLIS Dividing Head more than an ordinary indexing fixture. It is a precise, rugged unit with 6½" normal swing increased to 11" swing through the use of riser blocks. It TILTS more than 100 degrees in the vertical plane—SWIVELS 360 degrees in the horizontal plane—INDEXES by crank, or directly by hand. Work is held between centers, or in chucks or collets. The ELLIS Dividing Head is a universal work head that will increase the production versatility of your milling machines, grinders, drill presses and jig borers—write for complete details today.



Taft-Peirce Spline and Gear Grinder

A highly precise semi-automatic machine tool which is said to produce fine pitch gears and splines to unusually close tolerances, the Taft-Peirce Spline and Gear Grinder shown herewith is now being produced by the Taft-Peirce Manufacturing Co., Woonsocket, R. I. The machine is claimed to be particularly adapted for the grinding of precision gears and splines of small and medium size. The net clearance from the center line of the work arbor to the surface of



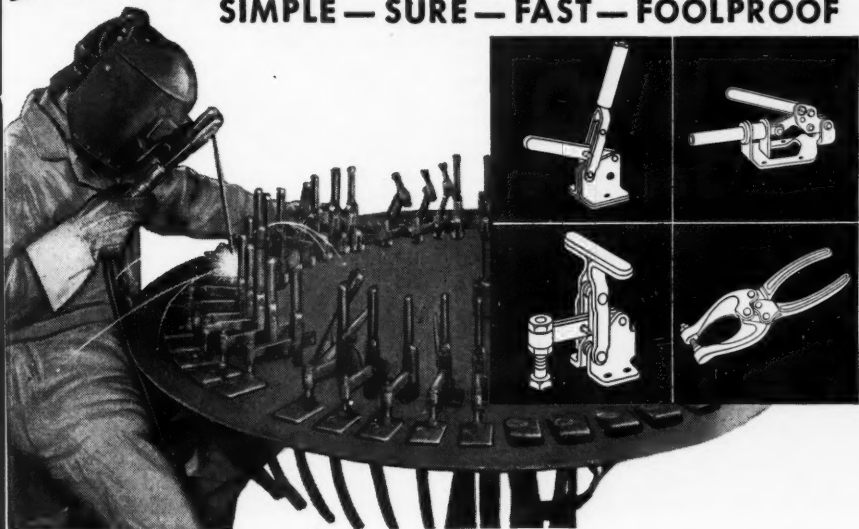
Taft-Peirce Spline and Gear Grinder

the table is 4¼ inches. The distance between centers is ample to allow for the accommodation of an 8-inch arbor.

The Taft-Peirce Spline and Gear Grinder utilizes the same standard base, column, and spindle head employed in the company's No. 1 precision surface grinder. The machine has hardened and ground ways, ball mounting of table, saddle, and column, and an anti-friction bearing spindle in the headstock. A lever-operated tailstock permits quick and easy removal of the work arbor. Automatic indexing is provided at the end of each stroke of the machine. Master plates are said to assure precision spacing. Backlash and play are eliminated by a special driving

SMART TOOLING!

SIMPLE — SURE — FAST — FOOLPROOF



Here's efficient tooling based on the quick action and positive holding power of De-Sta-Co Toggle Clamps. This simple turntable with its 48 No. 210-S clamps enables one welder to keep abreast of two helpers. One places curved shank in socket and unloads finished assemblies. The other locates pierced hole in plate over shank and locks securely with toggle clamp. The expert welder works without interruption.

Smart tooling like this is the backbone of modern mass production technique. You'll see De-Sta-Co Toggle Clamps playing a similar vital part *wherever* the principles of sound tool engineering are observed.

Welding production is *only one* of the many fields for quick acting clamps. For holding parts in milling, drilling, routing, riveting, cementing—for fast, uniform, *foolproof* action—progressive tooling demands De-Sta-Co adaptability and quality. There's a De-Sta-Co clamp for every job, designed and built to stand up under the wear and tear of volume production. Send for copy of Catalog No. 47.

DETROIT STAMPING COMPANY

349 Midland Ave.

Detroit 3, Mich.

dog with clamping device and by precision fits through the mechanism. Wheel dressing is accomplished with a 3-diamond dresser, attached in line with the work arbor.

Saddle and table locks are provided on the grinder to assure positive locking of either cross or longitudinal travel when necessary. All mechanisms are fully guarded against damage from grinding wheel grit. According to the manufacturer, the full ball bearing construction of the grinder minimizes friction, reduces operator fatigue, cuts wear and maintenance to a minimum, and greatly increases the accuracy of the machine. The compact design, sturdy construction, and vibration-proof mounting are said to contribute greatly to the precision and finish obtainable.

Cincinnati "Filmatic" No. 2 Centerless Grinding Machine

Designed to provide for maximum safety and long life and to facilitate setups, the Cincinnati "Filmatic" No. 2 Centerless Grinding Machine illustrated herewith has been brought out by Cincinnati Grinders, Inc., Cincinnati 9, Ohio. The

units supporting the regulating wheel housing (upper and lower slide) are mounted on an intermediate plate which has a swivel adjustment through a trunnion mounting on the bed. This type of mounting is said to facilitate setups, as it permits the operator to swivel the regulating wheel slides and quickly compensates for slight inaccuracies in truing the wheel. A large handwheel is used to adjust the upper and lower slides in relation to each other or as a unit when clamped together. The dial incorporated in this handwheel has 250 graduations, approximately 0.090 inch apart, for clear visibility of sizing adjustments.

Another set-up convenience, for infed work, is the lever-operated infed screw clamp. Lubrication of the slide ways and infed screw is effected through a built-in manually-operated "one-shot" system. Grit and coolant at the workrest end of the lower slide ways are said to be effectively excluded by a new type of guard.

Like the grinding wheel spindle, the regulating wheel spindle is mounted on Filmatic multi-shoe bearings. These bearings consist of segments or shoes, pivoted to allow the entrance of wedge-shaped oil films which develop high pressures between the segments and spindle. The multiple, high pressure oil wedges liter-



**A POWER UNIT THAT PROVIDES
WIDE RANGE OF APPLICATIONS**

LeMaire
TWIN RAM

- for drilling, boring, reaming, etc.
- vertically, horizontally, or at any angle
- in single or multiple arrangements
- can be transferred from one base to another

Send for complete catalog

LeMaire Tool & Mfg. Co.
2657 S. Telegraph Road
Dearborn, Michigan

Designers and builders of unit and way type machines for single or multiple spindle drilling, boring, reaming, tapping, etc.—Twin Ram Hydraulic Units—Match-it Gear Chucks.

ALCO TAP HOLDERS



Because the screw machine industry is of such tremendous importance in this modern war age in the production of the material to help bring peace as quickly as possible, it behooves each and every operator to see to it that his tool holders are so designed that they will lengthen tool life and obtain the maximum of production perfection.

Faster set-up, the elimination of all bushings, uninterrupted production, and adjustable, compensating concentricity are features provided by all ALCO TOOLS. On old machines with worn spindles, these features help overcome imperfections in work produced.

On new machines, they form an unbeatable combination of production efficiency.

THE TAP HOLDER SHOWN ABOVE IS JUST ONE OF THE FAMILY OF ALCO TOOL HOLDERS FOR ALL DRILLING, TAPPING AND THREAD CUTTING OPERATIONS ON SCREW MACHINES. WRITE FOR COMPLETE CATALOG.

ALCO TOOLS

THE ALCO TOOL CO.

152 Birdseye St., Bridgeport, Conn.

Detroit Office: 908 Stephenson Bldg.



Cincinnati "Filmatic"
No. 2 Centerless
Grinding Machine

panel semi-dust-proof. Push buttons are also built-in and are of the oil-tight type, operating at 110 volts through a transformer included in the electrical control panel.

The other hinged cover at the front of the machine, just below the push button, opens to the hydraulic circuit motor mounted in the bed. A large sheet metal

ally constitute a fluid vise which is said to maintain accurate dead-center rotation of the spindle under any load developed by the grinding operation. In conjunction with Filmatic bearings, both wheel spindles are automatically lubricated. A pressure switch in the grinding wheel spindle lubricating system is arranged to automatically stop the main drive motor if the oil pump should fail.

Electrical controls are built-in and protected by a hinged cover at the front of the machine. The latch handle constitutes an externally operated disconnect switch, interlocked so that the current is automatically shut off when the cover is opened. Two screws through the cover tighten it against a gasket to make the

cover at the grinding wheel end of the machine protects the main drive motor and V-belts. This motor is mounted on vertical rails which are hinged to the bed at their lower end and provided with screw adjustment at the upper end for belt tension.

The cover for the grinding wheel guard comprises an aluminum casting held in position by three star knob bolts, the upper one of which is hinged to facilitate removal of the cover. The guard is designed to accommodate crush dressers. Other design features include straight hydraulic grinding wheel truing, with arrangement for cam-controlled profile truing, if desired. The regulating wheel truing unit is manually operated and screw

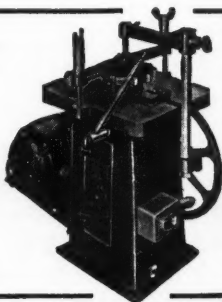
NO BUSHINGS, GUIDES or PILOTS NEEDED!

THE READING BROACH KEYSEATER

The Reading Bench Machine requires no bushings, guides or pilots. No other machine like it. Very fast—capacity from $\frac{1}{8}$ to $\frac{3}{8}$ cutter.

Low first cost—prompt delivery.

READING MACHINE COMPANY, Reading (Cincinnati), Ohio



SOUTH BEND

New Adjustable Collet Bushing Chuck

provides an accurate method for mounting centerless armature shafts and similar parts in a lathe. Use in either head or tail spindle. The brass collets are adjustable for running or driving fits. Chucks, supplied with 3 collets: 9/16", 5/8", and .637" capacity. Extra round collets, 1/4" to 1" by 16ths, \$1.00 each. **Chuck with No. 2 shank \$8.95**
Chuck with No. 3 shank \$9.45



Patent Pending

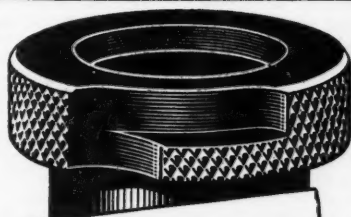
SOUTH BEND LATHE WORKS 427 E. Madison St.
South Bend 22, Ind.

Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S. Inexpensive — Last for years. Write for Circular.

NIELSEN TOOL & DIE COMPANY
1960 W. Eleven Mile Rd.
Berkley, Mich.



QUICK DELIVERY

Write for Specification
Sheets and Prices . .
COLONIAL BUSHINGS, Inc.
P.O. Box 37, Harper Station, Detroit 13

COLONIAL
DRILL JIG BUSHINGS

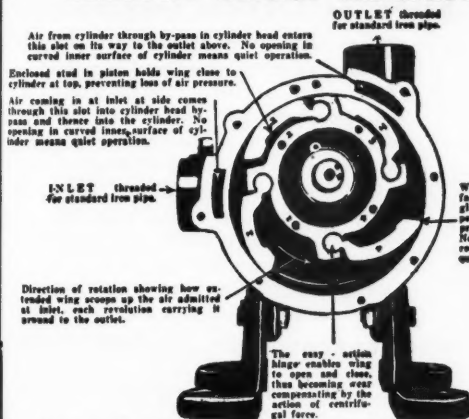
LEIMAN BROS. ROTARY VACUUM PUMPS

**Noiseless • Powerful
Efficient**

THEY TAKE UP THEIR OWN WEAR

**Machine Designers Secure
Good Results When They
Use the Standard Rotary
Vacuum Pump of All
Industry**

Made in many sizes to fit any purpose or any dimensions—used in all industries for picking up and carrying sheets of paper, cardboard, tin or other materials; handling liquids by vacuum or pressure as in bottle filling operations; also for agitating solutions; aerating water as in fish aquariums and elsewhere. They operate vacuum printing frames; vacuum canning machines, cooling linotype machine molds, gas and oil burning appliances, furnaces, blowpipes, etc., used in hospitals for etherizing, vacuum treatments, wound cleaning in operations; all sorts of operations in filling bags, cartons, collapsible tubes, and containers of all sorts; for creating instant and high heat in steam radiators; for vacuum holding chucks and for hundreds of other uses.



**GET FREE
BULLETIN**

LEIMAN BROS.

**168-1 CHRISTIE ST.
NEWARK 5, N. J.**

propelled. However, it can be readily replaced with a hydraulically operated unit, arranged for profile truing, as required for some types of infeed work. Regulating wheel speeds are changed by lever-operated sliding gears. Twelve speeds from 12 to 300 r.p.m. are available. A centrifugal motor driven pump, mounted in the tank at the rear of the machine, circulates the coolant. An individual stream of coolant is directed to the truing diamond by means of a three-way valve in the coolant line.

Many attachments are available for the machine, including long bar grinding attachments, plastic tube and rod grinding attachments, hopper feed units, magazine loading devices, and so on.

Sommer & Adams Special Processing Machine

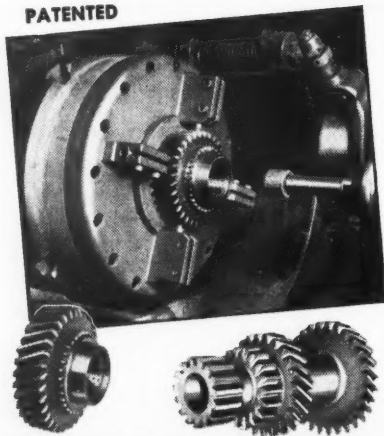
The Sommer and Adams Co., Warren, Ohio, announces the development of a high-production special processing machine for drilling, reaming, and counterboring automobile engine connecting rods and caps. The machine, which is over 11 feet high and weighs 30,000 lb., is de-

signed to produce over 240 drilled, reamed, and counterbored assemblies per hour with a single operator.

The five-station machine is all push-button controlled, and the spindles are controlled for toolset-up purposes through manual controls on each individual station. The machine, which also has an automatic cycle for continuous operation, is equipped with a motor-driven hydraulic unit for indexing and locking the table. The hydraulic system employs a 5 P.W.X. variable-displacement pump which automatically adjusts itself for proper pressure. Each of the five stations has a self-contained hydraulic system. One motor on each unit operates the multiple-spindle drill head through a train of gears, and each head is adaptable for drills, reamers, and counterborers. The equipment is supplied with a motor-driven coolant pump delivering 75 gallons per minute.

The workpieces, which are broached before being brought to the machine, are worked four at a time at each station. The sequence of operations at the various stations is as follows: Station 1 counterbores the cap shoulder; Station 2 drills through the cap and spots the connecting rod (both pieces in position); Station

PATENTED



DIAPHRAGM CHUCKS

Look, a high speed, precision chuck with no parts to wear out! Result: Maximum accuracy, minimum maintenance! Because the Woodworth design assures the ultimate in concentric chucking. Obviously, it will solve your precision chucking problems, as it has already for large manufacturers of gears and other production parts. Send your precision chucking problems to us—at no obligation.

MECHANICALLY OR AIR OPERATED

ACCURACY YOU CAN TRUST

WOODWORTH

N. A. WOODWORTH CO., SALES DIVISION • 1300 E. NINE MILE RD., DETROIT 20, MICH.

AUTOM



CONTINUOUS HINGES

Manufactured by
**AUTO MOULDING
& MFG. CO.**

WRITE FOR STOCK LIST

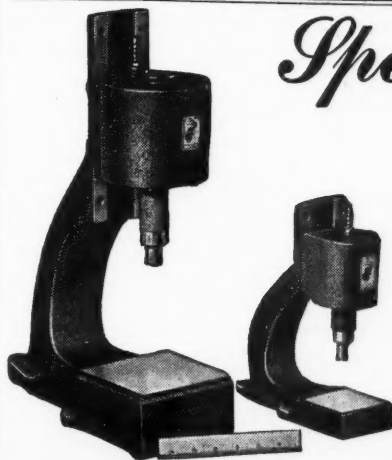
1114 E. 87TH ST.

CHICAGO 19



TYPE HOLDERS AND TYPE ... ROLL MARKERS ...
HAND STAMPS ... LOGOTYPES ... DIES ... STANDARD
AND SPECIAL STAMPS ... INSPECTORS' STAMPS ...
MACHINE ENGRAVING ... PRECISION DUPLICATING

NEW METHOD STEEL STAMPS, Inc.
149 Joseph Campau, Detroit 7, U.S.A.

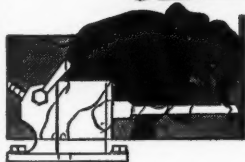


*Speed Up Work
with*

MEAD AIR PRESS

These new Mead Air Presses deliver 400 and 1200 lbs. pressure respectively on 100 PSI. Handle many staking, crimping, assembly, and similar operations. Clearances 4" and 7½" respectively. With foot control these

presses will speed up countless bench jobs, save muscular effort. Write for new Air Power Catalog—just off the press.

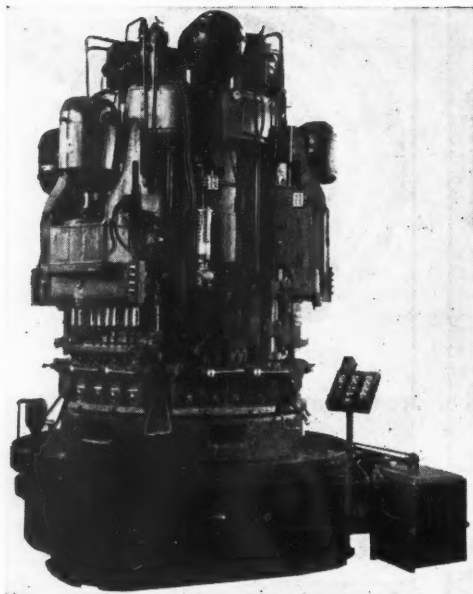


MEAD SPECIALTIES COMPANY

4114 NORTH KNOX AVE.

DEPT. AA-18

CHICAGO 41, U. S. A.



Sommer & Adams Special Processing Machine

The electrical control panel is used to operate all motors. Push buttons work on 110 volts, while the motors operate on 220 volts, 60-cycle 3-phase current. Relays and solenoids convert the electrical energy to the mechanical energy necessary to actuate the various units of the machine. The equipment is supplied complete with an automatic lubrication system.

Excel No. 7 Surface Grinder

Identified as the Excel No. 7, a hand-feed surface grinder for accurately grinding tools, dies, and chip breakers, and many other toolroom jobs is announced by the Covell Manufacturing Co., Benton Harbor, Mich. Due to its rugged construction, the machine is also suitable for many production jobs.

According to the manufacturer, the convenient grouping and location of the controls of the machine offer maximum accessibility from any working position, and simplicity of control enables small order lot jobs and other work to be handled with ease, rapidity, and precision. In setting up a job, the operator has only to adjust the grinding wheel to the work and begin grinding; there are no dogs or feeds to set or adjust.

The construction of the Excel No. 7 Surface Grinder includes a precision ball bearing sealed-for-life spindle and a hardened spiral pinion and rack which are

3, using a drill smaller than that used at Station 1, drills through the connecting rod; Station 4 core drills run through cap and connecting rod, thus lining up pieces and creating a semi-finish in the bores; and Station 5 removes the final stock (0.0003 to 0.0005 inch), providing a final line-up of the parts and a smooth reamed finish to the bores. These operations leave the connecting rod and the cap assembly ready for use. Since the fastening bolts, each of which has a smooth ground surface, are positioned with a light tapped fit snug enough to prevent any play, the bolts act as fasteners and locating dowels.

PRODUCERS OF SCREW MACHINE PRODUCTS TO SPECIFICATIONS

We have:

ONE, FOUR and SIX spindle automatics maximum capacity 2½" round. Hand Screw Machines and Universal Turret Lathes maximum capacity 3" round. Castings and Forgings machined maximum 10" diameter, 8" length, 15 pound weight. Secondary operation equipment for milling, drilling, tapping and assembling. Fabricators of aluminum, brass, steel and their alloys.

WRITE FOR ESTIMATE

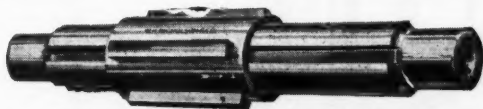
SCREW MACHINE SPECIALTY CO.,

• 5700 Butler St., Pittsburgh 1, Pa.

Put Your Stop Watch

→ on NICHOLSON EXPANDING MANDRELS

Test the time-saving possibilities of these widely used precision tools. Not infrequently, time studies show operations are completed in less time than was formerly consumed in looking for or turning a solid



**BULLETIN 1043 SHOWS YOU HOW TO
Save Set-up Time . Promote Precision**

arbor. Set of 14 does work of 209 solid arbors. For all bores 1/2" to 7". Hardened tool steel. Sold singly or in sets.

W. H. NICHOLSON & CO., 136 Oregon St., Wilkes-Barre, Pa.

Valves . Traps . Floats . Steam Specialties

GET THIS VALUABLE KIT ABSOLUTELY *FREE!*

Write today!



6

LIBERAL JARS

DIFFERENT
GRADES

SOLVE

PRECISION LAPPING PROBLEMS

With this trial carton your own experience will tell you why these finer quality, finer grit compounds are right for all precision lapping. Carton contains six grades of compounds, all fine grit sizes best suited to a variety of work. Mailed postpaid anywhere in U.S.A. No obligation. Write today.

Prove

**THEM ON YOUR
TOUGHEST
OPERATIONS**

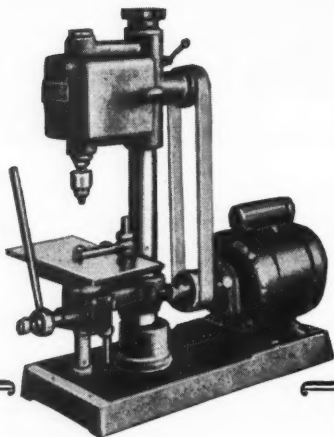
at Our Expense!

UNITED STATES PRODUCTS CO.

518 MELWOOD ST.



PITTSBURGH, PA.



INSTRUMENT TAPPER (SUPER-SENSITIVE)

The Hamilton Super-Sensitive Tapping Machine is designed for the precision industries. Tapping capacity, from the smallest and finest tap to 10-32 inclusive.

This machine has every wanted feature. Ease of operation. Height adjustable table. Adjustable stops. Ample clearances and travel. Silent and clean in operation.

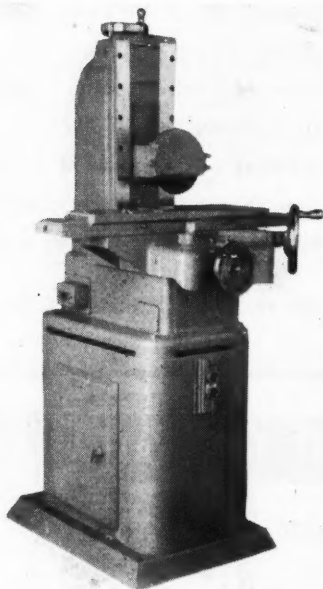
Patented power transmission permits centering of tap without cutting and tapping to the very bottom of blind holes without tap breakage.

Our Bulletin T-47 gives the story and specifications complete. Write for it.



said to assure smooth table operation. The ways of the machine are dust protected, and the motor is enclosed in the machine base away from the grinding dust. The machine can be furnished in either a bench or floor type, with a wet grinding attachment available as extra equipment.

Specifications of the machine are as follows: working surface, 5% x 10% in-



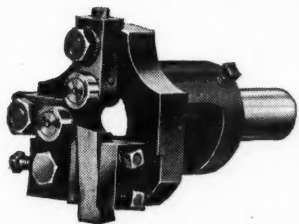
Excel No. 7 Surface Grinder

ches; longitudinal travel, 12 inches; cross travel, 6 $\frac{1}{8}$ inches; distance under 7-inch wheel, 9 inches; grinding wheel, 7 x $\frac{1}{2}$ x 1 $\frac{1}{4}$ inches; motor, $\frac{1}{2}$ h.p. 1,750 r.p.m.; floor space, 36 x 44 inches; net weight (floor type), 825 lb.; and shipping weight (floor type), 975 pounds.

Fellows 36-Inch Gear Shaper

For general purpose gear cutting, The Fellows Gear Shaper Co., Springfield, Vt., is offering a 36-inch gear shaper which is of massive construction and can be adapted to the cutting of external and

WATSON Tangent Cut Box Tool



A general purpose, tangent cut, roller rest box tool of wide range for turning diameters from bar stock, castings, forgings or other material. Applicable to all sorts of screw, turret and other machines, hand or automatic. It is simple to set and eliminates resetting when it is necessary to grind the bit. Write for descriptive folder giving complete information.

The Watson Mfg. Co.
2222 ALBION ST. TOLEDO 6, OHIO

For More Tool Mileage



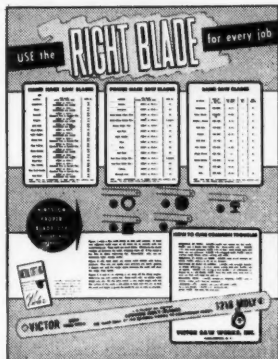
Tool No. 511
Heavy Duty
Slip Joint Pliers

**PLIERS FOR
EVERY NEED**

UTICA DROP FORGE & TOOL CORP.
UTICA 4, NEW YORK

make blade selection
 a cinch
not a search

use
the
new



VICTOR WALL CHART

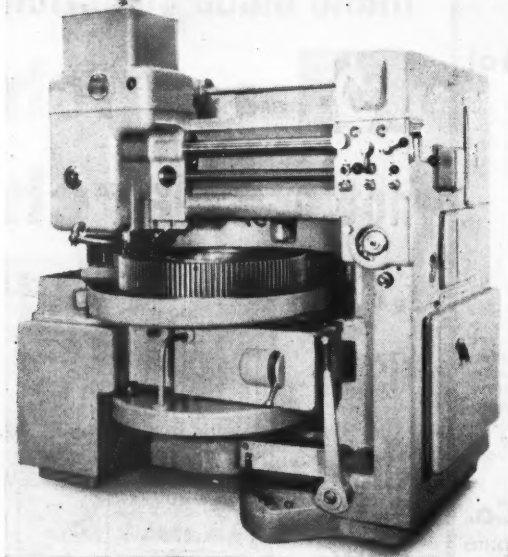
You'll see the name of the blade you want to use — hand, power or band saw — opposite the type of material you want to cut. You'll see this valuable information quickly, easily, when you tack the new Victor wall chart over your tool crib or in your machine shop.

What's more you'll get a lot of inside tips on how to get longer life, the best use, from every blade... There are plenty of ways to cut costs, make money, on this new Victor Wall Chart... It's printed clearly, attractively, and it's yours absolutely FREE.

Drop in on your Victor supplier — or send him a card today. *The supply is limited.* Also see him the next time you want the finest in cutting performance. He carries a full line of Victor blades — one for every job a hack saw or a band saw can do. Victor blades cut better, too, on metals, plastics, and other non-metallics... cut faster, cleaner, last longer.

 3708
VICTOR SAW WORKS, INC.
MIDDLETOWN, N. Y., U. S. A.

Fellows 36-Inch Gear Shaper



provided for holding the apron when it is opened to allow for loading and unloading large gears.

The Fellows 36-Inch Gear Shaper provides a wide range of feeds and speeds. Twelve different reciprocating speeds ranging from 18 to 300 strokes per minute are obtainable through a selecting dial located at the front of the machine and within convenient reach of the operator. Four rotary feeds are available through a 4-speed transmission controlled by a feed shift lever. Additional feeds are obtainable by changing two pick-off gears.

The arrangement for controlling the depth of feed of the machine includes limit switches and adjustable dogs. The dogs are held on a drum mounted on the speed-cam shaft, which is rotated intermittently by a cam

internal spur and helical gears. The large one-piece cutter spindle is designed to accommodate a 5-inch cutter and is operated by a heavy and rigid reciprocating mechanism. The saddle on which the cutter spindle and guides are located is also of heavy design with squarelock gibs, and is rigidly supported on the bed.

The apron supporting the work spindle, which has a 5 $\frac{1}{8}$ -inch straight hole, is mounted in the base integral with the cabinet. The apron is positively locked in the cutting position by a relieving and locking mechanism, and the relieving cam can also be changed without removing the crankshaft. Additional support is

and latched ratchet driven by the crankshaft that reciprocates the cutter. The cutter can be fed to any desired depth by independently adjustable steps as determined by the number and position of the dogs. Rotating of the work can be determined at any depth of cut by a counter which is mechanically driven from the lower index-wheel wormshaft and which operates electrical contacts at each complete revolution of the work.

When the "power-on" selector switch of the machine is turned on, the lubrication pump commences to operate and power is afforded to the "start" button for the main motor. Pressure on the



"PRODUCTION" TYPE S Centerless

SURFACER • POLISHER • BUFFER

This versatile machine combines a centerless feed polishing machine with a vertical or horizontal belt grinder, surfacer, polisher or buffer. Ideal for cylindrical polishing or straight line finishing on flat work. Can be used for anything that can be ground or polished—metals, rubber, fibre, wood, etc.

Write for Illustrated Folder

PRODUCTION MACHINE CO. • GREENFIELD, MASS.



ONE CUTTER FOR THREE CLASSES OF WORK!

Available
4" to 14"

BODIES AND SOLID
CARBIDE BLADES
CARRIED IN STOCK



Switch to another set of standard solid carbide blades and use this body for any face milling job on any material. Here are features and simplicity tool men like—easy blade interchange, no threads in the body, wedges behind the blades to take the shock and spare the body . . . Blades properly ground for various classes of work are stocked by Super and ready for immediate shipment. See Super Tool Company's Standard Carbide Tipped Tool Catalog No. 47. If you need a copy, write for one today.

Aluminum!

Dural, Magnesium,
Plastics, Etc.



10° RADIAL RAKE

7° AXIAL RAKE



Steel!



10° RADIAL RAKE

7° AXIAL RAKE



Cast Iron!

Brass, Malleable
Iron, Etc.



0° RADIAL RAKE

0° AXIAL RAKE



STANDARD AND SPECIAL

SUPER

Carbide Tools

SUPER TOOL COMPANY

21650 Hoover Rd., Detroit 13, Michigan

5210 San Fernando Rd., Glendale 3, California

start button causes cutter reciprocation and rotation of the cutter and work. The cutter is fed into the work until the first dog operates the limit switch, at which point the in-feed is stopped by a solenoid which locks out the ratchet feed mechanism. At this point, the counter clutch coil is de-energized to start rotation count of the work. Upon completion of one revolution of the work, a counter contact operates to cause the depth-feed solenoid to unlock, and rotary feed progresses as before until the next dog engages the limit switch. This cycle is repeated for each dog until the final cut is made, at which time the machine stops automatically.

On the final cut, control of the machine is picked up by the second limit switch and a fixed dog on the depth-feed cam drum. This second limit switch initiates the same function as previously described and, in addition, transfers the main drive holding circuit from a "biased" relay (permanent magnet latching type) to a standard relay. After the final cut is completed, operation of the counter causes the holding relay to be de-energized, which action, in turn, de-energizes the main drive, thereby stopping the machine.

According to the manufacturer, the

Fellows 36-Inch Gear Shaper is easy to set up and operate and is provided with complete electrical control. The general specifications of the machine are as follows: pitch diameter (external and internal), 36 inches; diametral pitch, 3 spur and 4/5 helical; face width (external and internal), 5 inches; helix angle (standard guides), 45 deg.; outside diameter of fixture, 40 inches; and approximate net weight, 12,000 pounds.

Brown & Sharpe No. 5 Cutter and Tool Grinding Machine

Designed specifically for use in performing a wide variety of toolroom sharpening jobs of the small class, particularly grinding operations on end mills, the Brown & Sharpe No. 5 Cutter and Tool Grinding Machine illustrated herewith has been developed by the Brown & Sharpe Manufacturing Co., Providence 1, R. I. An outstanding feature claimed for the machine is its super-sensitive operation, the unit being readily responsive to a light touch from the operator, thereby making operation not only fast and easy but allowing for quick and accurate setups.



Severance MIDGET MILLS

HIGH SPEED—CARBIDE—GROUND—FROM—THE—SOLID

1/4" SIZE

25 SHAPES H.S.

10 LEADERS

from more than
20 SHAPES
with several sizes
of each shape.

**a truly
REVOLUTIONARY
Cutting Tool**

Obtain the best
from the originator
of
GROUND—from-the-Solid

**WRITE FOR
CATALOG NO 16**

1/8" SHANKS

JUNIOR MILLS High Speed—Carbide

1 1/8" LONG

Practical for use on small grinders for
finishing Patterns, Dies, Parts, etc., in
places difficult to reach with the larger
Mills.

**GROUND FROM THE
SOLID**

**SET
OF 10**

LAB MILLS High Speed

3/8" SHANK 1 1/2" LONG

GROUND—from-the-Solid

These speedy Mills for Dental Laboratories find many uses in Jewelry and in Die and Mold making. Available in 7 popular shapes of 4 or more sizes, each for the finest cutting and finishing. May be reground up to 8 times per 1/32" reduction in diameter.

**ACTUAL
SIZE**

COMPLETE REGRINDING SERVICE • BY NEW TOOL CRAFTSMEN • SAVES YOU MONEY

SEVERANCE TOOL INDUSTRIES INC.

724 Iowa Street • Saginaw, Mich.

AUTO REVERSE TAPPING CHUCKS



**MULTIPLE
TAPPING HEADS**

**CLUTCH OR
CONE-DRIVE
TAPPING CHUCKS**

**OPENING
STUD-SETTERS**

**QUICK-CHANGE
DRILLING, TAPPING
AND STUD-SETTING
ATTACHMENTS**

**POSITIVE, FRICTION,
INTER-CHANGEABLE
TAP-HOLDERS**

Established 1891

ERRINGTON MECHANICAL LAB.

Main Office and Works:

STATEN ISLAND 4, NEW YORK

ANNOUNCING

**A New Member in the M&N Line of
Hydraulic Presses
THE 30-TON ELECTRIC HOT PLATE
MOLDING PRESS**

This new press is especially designed for the rubber and plastics industries, where speed and ease of operation is essential to low cost production, and laboratory uses. This press can be had with any desired number of openings, either electric heated or steam platens, at a slight additional cost; or larger platens. Motor driven hydraulic power units are also available.

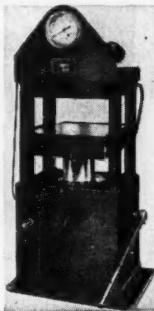
Outstanding features of this new press include: Visual temperature indicator. Electrically heated thermostatically controlled platens. Dual pressure hand pump. Compactness. Large platen area. All steel construction.

SPECIFICATIONS: Size of Base, 16"x12"; Overall height, 42"; Platen size, 12"x12"; Capacity, 30 tons; Daylight opening, 10"; Stroke, 6"; Ram dia., 5"; Approx. Weight, 400 lbs.

M&N MACHINE TOOL WORKS INC.

144 Orono St.

Clifton, N. J.



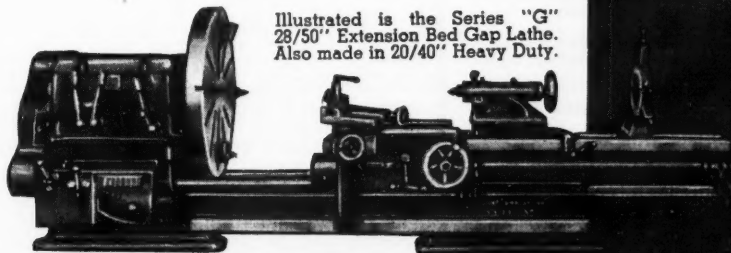
\$525.00

Extension Bed Gap Lathes

The Extension Bed Gap Lathe is designed to be used either as a gap lathe or an engine lathe. We also manufacture a line of regular geared head engine lathes.

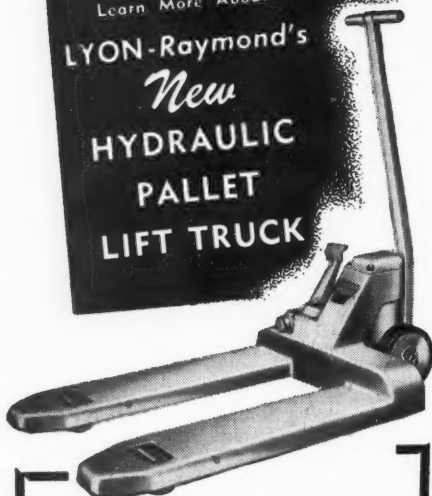
Write for circulars.

Illustrated is the Series "G"
28/50" Extension Bed Gap Lathe.
Also made in 20/40" Heavy Duty.



The Nebel Machine Tool Co.
CINCINNATI OHIO

Learn More About
LYON-Raymond's
New
**HYDRAULIC
PALLET
LIFT TRUCK**



**Streamlined!
Lightweight!**

FRAME

High strength alloy sheet steel formed into strong box sections.

AXLES

Heat-treated alloy steel.

WHEELS

(and other non-structural parts) made from aluminum alloy.

BEARINGS

Anti-friction bearings used at all important points in lifting mechanism.

WORKING PARTS

Totally enclosed for better protection.

WEIGHT

Reduced to a minimum by new design and modern lightweight construction.

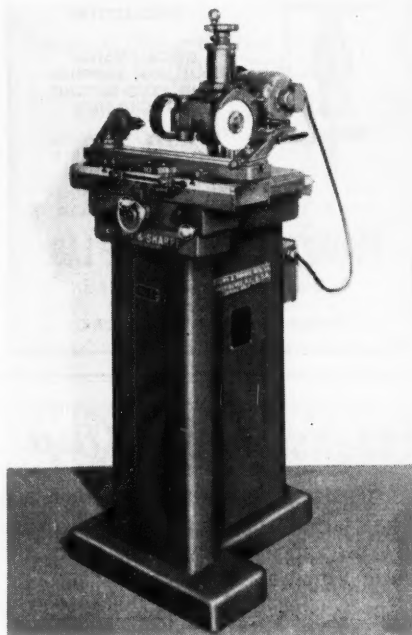
This advanced construction fits the Lyon-Raymond Hydraulic Pallet Lift Truck to do jobs with speed and ease never before attained by hand pallet trucks. Write today for complete information that may save you time and money!

**LYON - Raymond
CORPORATION**

667 Madison St.,

Greene, N. Y.

The construction of the machine includes a uniquely designed table which slides on 36 precision-ground rolls. Lightweight parts also contribute in providing a machine engineered for fast and accurate sharpening and incorporating such features as a desirable work center height and conveniently located controls (four-location table crank or knob). The machine includes a double-ended ball bearing wheel spindle with bearings of the



**Brown & Sharpe No. 5 Cutter and Tool
Grinding Machine**

super - precision permanently - sealed grease-lubricated type. The construction features of the machine also include a one-piece base which is mounted on three points to maintain alignment.

Specifications of the Brown & Sharpe No. 5 Cutter and Grinding Machine are as follows: maximum diameter of work which can be swung between centers, 6 $\frac{1}{2}$ inches; maximum distance from center line of work to center of wheel spindle, 8 $\frac{1}{2}$ inches; minimum distance from center line of work to center of wheel spindle, 1 $\frac{1}{2}$ inches; maximum distance

INTERESTED IN A 300% INCREASE IN STAMPING PRODUCTION USING YOUR PRESENT PRESSES ?



THEN INSTALL
ONE OF THESE
NEW, LOW-COST
**DICKERMAN
DIE FEEDS**

*Photo courtesy of
Federal Tool Corp., Chicago, Ill.
Designers and builders of
9 Station Progressive Dies*

THIS IS NO FAIRY TALE. Dickerman Die Feeds are actually increasing production 300% or more in many shops. They will do the same for you, used on your present punch presses.

*Send for Free
Catalog Today!*



IN ADDITION, they reduce operator hours 80 to 90 percent, due to their accuracy, reliability, versatility. They increase die life through elimination of costly jams and crack-ups — can be attached to any press.

THESE FIGURES ARE FACTS, so why look further? Replace worn punch press feeds **NOW** with the new improved Dickerman Die Feeds. Send for free illustrated catalog **TODAY.**

H. E. DICKERMAN MFG. CO.
322-15 ALBANY STREET, SPRINGFIELD, MASS.

from center of wheel spindle to top of table, $6\frac{1}{2}$ inches; minimum distance from center of wheel spindle to top of table, 1 $\frac{1}{2}$ inches; transverse movement of spindle slide upright, $4\frac{1}{2}$ inches; longitudinal adjustment of spindle slide upright, 3 inches; and vertical adjustment of wheel spindle slide, $5\frac{1}{2}$ inches. The transverse adjustment handwheel for the spindle slide upright is graduated to read to 0.001 inch, as is the elevating handwheel for the wheel spindle slide. Additional equipment is available for the machine for work requiring indexing and formed cutter sharpening.

Cerrolow Low-Temperature Melting Alloy

To meet the demand for an alloy with an unusually low melting temperature (below 150 deg. F.), the Cerro de Pasco Copper Corp., Dept. 10, 40 Wall St., New York 5, N. Y., has developed an indium alloy, designated as Cerrolow, which is available in five types having melting temperatures from 105 to 170 deg. Fahrenheit.

Cerrolow-117 and Cerrolow-136 are eutectic alloys having sharp melting points

or zero freezing ranges. These properties are said to make the alloys particularly useful in applications where definite melting points are desired. These eutectics can be readily modified to produce a plastic range where this property is desirable. Cerrolow-174 is a non-eutectic alloy which is claimed to produce an unusually satisfactory solder.

Cerroseal is the name of an alloy in which indium is the major component. It is offered in a range of melting temperatures from 239 to 315 deg. F. The most outstanding property claimed for this alloy is its ability to adhere to glass, thereby affording a means for joining glass to glass and glass to metal.

Besly No. 372 72-Inch Vertical Spindle Grinder

Charles H. Besly and Co., 118-124 N. Clinton St., Chicago 6, Ill., is now producing a 72-inch vertical spindle grinder originally designed for grinding cast iron gear housings but readily adaptable to many types of production grinding.

Identified as the No. 372, the machine features a power-driven rotary fixture in-



KLANKATOR CHECKS DIAL INDICATORS



MASTER DIAMOND CHECKING SET

CLARK

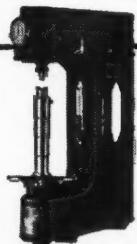
Gives Continued Accuracy, Rapid Measurements

THE CLARK has everything you want in a hardness tester—direct reading precision dial, durable construction, ease of servicing. Three standard models shipped complete with weights, dust protectors, diamond and steel penetrators, test blocks, and anvils.

CLARKATOR CHECKS DIAL INDICATORS with micrometer speed and sine bar accuracy. Easy to operate—just four simple steps. Complete instructions permanently fastened to base.

MASTER DIAMOND CHECKING SET eliminates hardness tester errors. Consists of a master diamond penetrator and two test blocks. Precision is assured over a long period because the set is used only for checking. Furnished in leather case.

Learn the truth about hardness testing! This 20-page reference manual (right) contains information on history, theory, practice, and equipment for modern hardness testing. Available to executives without charge. Write Dept. MMS today!



CLARK HARDNESS TESTER



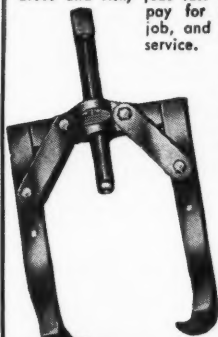
CLARK INSTRUMENT, INC.

10200 Ford Road.

• Dearborn, Mich.

ARMSTRONG - BRAY Gear & Wheel Pullers

These powerful service tools Pull gears, wheels, bearings and bushings from shafts, easily and quickly. They eliminate pounding, battering and breakage of vital machine parts. They make tedious and risky jobs fast and safe. They usually pay for themselves in the first job, and give years of satisfying service.



12 types, 40 sizes (including special designs for special application) with Drop forged arms and heat treated forcing screws.

Write for circular

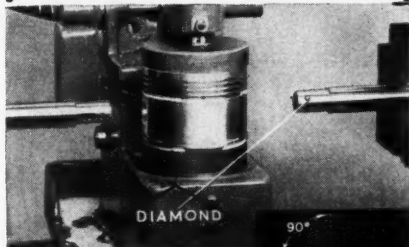
**ARMSTRONG-
BRAY & CO.**

5346 Northwest
Highway,

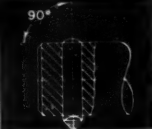
Chicago 30, Ill.



GILMORE DIAMOND BORING TOOLS



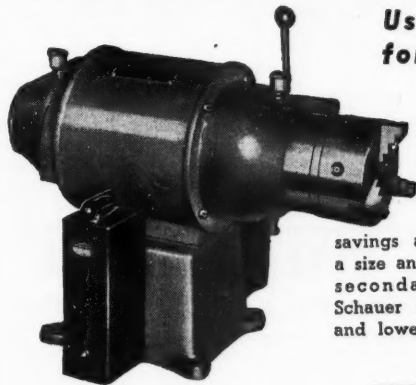
The diamonds in these tools are carefully chosen under strong magnification to make certain they have inherent qualities that render long boring service. • Write for data book on diamonds for Turning, Boring, Testing.



F. F. GILMORE CO. 285 Columbus Ave.
Boston 16 • Mass.

Diamond-Boring, Turning, Facing, Engraving,
Truing Tools, Styli, Gage Contacts.

Step Up Production--Reduce Costs!



Schauer Speed Lathe NA2B

Use Schauer Speed Lathes for Secondary Operations

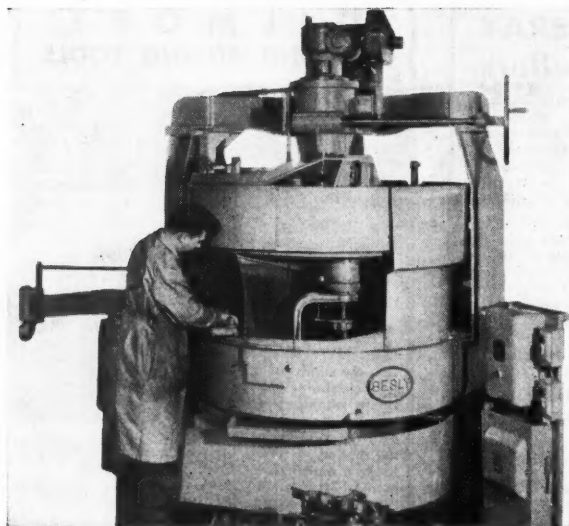
These small, inexpensive machines polish, lap, de-burr, or finish small metal and plastic parts 50% to 90% faster, more accurately and uniformly - and pay for themselves in product savings and lower production costs. There is a size and type of Schauer Speed Lathe for any secondary finishing operation. Learn how Schauer Speed Lathes can increase production and lower costs in your plant.

Write for Catalog 440

THE SCHAUER MACHINE CO.

2060 Reading Rd.

Cincinnati 2, Ohio



Besly No. 372 72-inch Vertical Spindle Grinder

to which the operator places the castings. The rotating fixture and revolving work holders transport the castings through the grinding cycle at one revolution every 60 seconds, with four pieces being ground simultaneously. Approximately 1/32 inch of metal is said to be removed from each casting during the grinding cycle. When smaller castings are ground, two or more can be placed in each work holder.

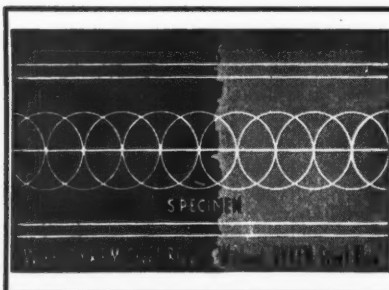
"Di-Acro" Notcher

The "Di-Acro" Notcher, a sturdy, flexible, precision shearing unit which is said to rapidly and accurately cut notches in sheet materials, is announced by the O'Neill-Irwin Manufacturing Co., 306 Eighth Ave., Lake City, Minn. According

to the manufacturer, a 90-deg. notch of any size within the capacity of the machine can be accurately cut in one operation either at the corner or in any position along the edge of a sheet. The unit can also be used in shearing angles both smaller and greater than 90 deg. In addition, many straight shearing operations can be performed with the unit.

An extremely flexible gaging arrangement built into the Di-Acro Notcher allows a notch of any dimensions desired to be exactly located, thus providing precision in all duplicated parts, it is claimed. The powerful action of the notcher is said to be obtained through a roller bearing cam which is designed to evenly distribute the shearing pressure simultaneously on both shear blades. The precision construction of the unit and its triangular shaped ram, which is arranged to positively control the position of the shear blades, assures a clean cut free from rough edges or burrs even in the heaviest materials within the capacity of the machine, the manufacturer claims.

The Di-Acro Notcher has a cutting range which extends from the lightest of materials in plastics, fiber, mica, leather, and rubber to heavy gauges of aluminum, cobalt steel, chrome molybdenum, leaded brass, and stainless steel. The cutting head comprises a solid block of alloy tool



DYKEM STEEL BLUE

Stops Losses in Making Dies and Templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

THE DYKEM COMPANY

2301F NORTH 11th ST.

ST. LOUIS, MO.

(In Canada: 2466 Dundas St., West, Toronto, Ont.)

Mr. CONSUMER & COMPANY

PURCHASE ORDER No. 2778
To KEMPSMITH DISTRIBUTOR

THIS MATERIAL MUST BE
DELIVERED WITHOUT FAIL
IMMEDIATELY!

PLEASE SHIP US MORE KEMPSMITHS



The *trend* in the
Industry is Toward
KEMPSMITH

More and more manufacturers are utilizing Kempsmith standard attachments to help solve their milling problems. Kempsmith precision-built milling machine accessories are made to perform the most delicate milling operations, with speed and accuracy. They frequently eliminate the need for expensive, single-purpose machines . . . cut production costs to rock bottom. And remember, every Kempsmith product is backed by Kempsmith's 57 years of specialized experience manufacturing milling machines and equipment exclusively.

SMALL TOOLS DISTRIBUTORS — Kempsmith has a new liberal sales plan for you. Write for further details.

THE KEMPSMITH MACHINE CO.
1835 S. 71ST STREET • MILWAUKEE 14, WISCONSIN, U. S. A.

KEMPSMITH

• Precision Built Milling Machines Since 1888 •

A 5235-1P-C



"Di-Acro" Notcher

steel which is hardened and precision ground. The lower blades are also made of alloy tool steel and are readily adjustable for exacting operations. The base and body of the unit are sturdily constructed of machine tool gray iron. A short handle is provided for the rapid

shearing of light materials, while a longer handle is supplied for heavy shearing operations so as to reduce operator effort.

Specifications of the Di-Acro Notcher are as follows: material capacity, 16 gauge steel plate; maximum 90-deg. notch, 6 x 6 inches; and weight, 100 lbs.

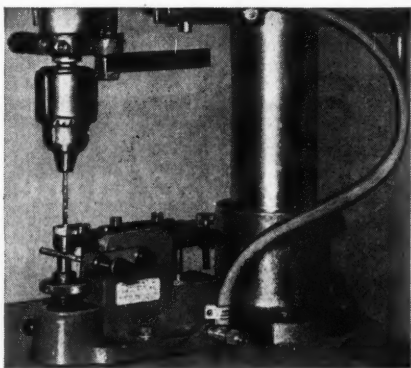
Trindl Limited Input Transformer-Type Arc Welder

An improved general purpose limited input transformer-type arc welder for use on single phase, rural, and other power lines of limited capacity has been added to the "Job-Tested" line of welders offered by Trindl Products, Ltd., 17 E. 23rd St., Chicago 16, Ill. Designed to conform with both R.E.A. and N.E.M.A. specification requirements, the welder is said to be fully approved by Underwriters' Laboratories and is available both with and without power factor correction in output ratings of 130 and 180 amperes. The unit is supplied complete, ready to operate, with hand shield, electrode holder, welding, ground and power cables, wall receptacle, generous supply of as-

NEW POR-MATIC **AIR-OPERATED** **DRILLING FIXTURE**

● This new POR-MATIC air-operated Universal drilling fixture is rigid, sturdy and machined to exact tolerances. It will handle round stock 1/16" to 1" and by using a special upper beam or drill bushing carrier 1 1/2" can be received for cross drilling. This fixture can be mounted on any of the regular bench type or floor type drill presses in a matter of minutes. Depending on type of material and diameter of hole size, it will increase production from 33% to 200%.

Send for literature giving complete description.

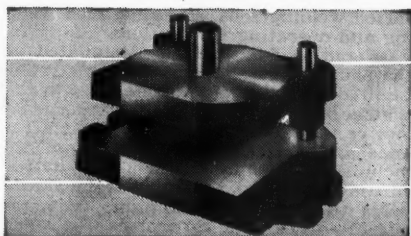


Patent Pending

THE PORTER MACHINE CO.

3139 ENYART AVE

CINCINNATI 9, OHIO



DANLY PRECISION DIE SETS

STANDARD OR SPECIAL

**Their Precision Means Greater
Accuracy in Your Production**

DANLY MACHINE SPECIALTIES, INC.

2100 South 52nd Ave., Chicago 50, Illinois

Milwaukee • Detroit • Cleveland • Dayton
Rochester • Philadelphia • Long Island City
Ducommun Metals & Supply Co., Los Angeles

GWILLIAM



TYPE RT

ROLLER THRUST BEARINGS

• Made with flat seats and in a variety of self-aligning types. These bearings are especially adapted for heavy loads at slow or moderate speeds. Standard sizes shown in our general catalog. Copy sent upon request. Also ask for illustrated literature on Gwilliam ball thrust and roller thrust bearings.

THE GWILLIAM CO.

358 FURMAN ST.

BROOKLYN 2, N. Y.



TAP BREAKAGE *Reduced*

**Square, Straight Tapping
in Half the Time**

The Dahlstrom Tap Guide practically eliminates tap breakage and saves wasted hours getting broken taps out of expensive dies. It does the job in a jiffy with work always straight and true. Just fasten it to a post or bench, slip a Tap Adaptor into the spindle, and even an inexperienced operator can handle it. Equipped with 7 Adaptors, ranging from 8-32 to 1/2". Taps not furnished. Ask your mill supply house, or \$52.50 F.O.B. Minneapolis.

Literature on request.

Dahlstrom Manufacturing Co.

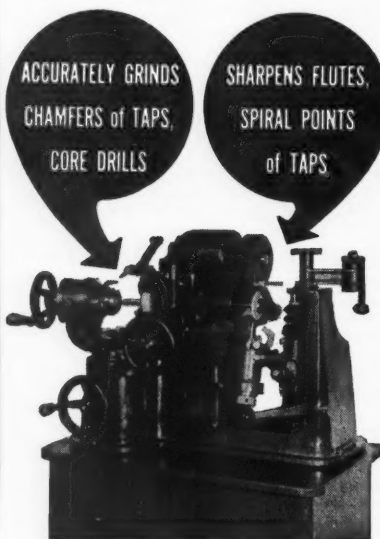
418 South Sixth St., Minneapolis 15, Minn.



**52.50
F. O. B.
MINNEAPOLIS**

Dahlstrom TAP GUIDE

THE New MODEL 1100 HYBCO TAP GRINDER



- Capacities No. 2 Mach. Screw to 1½" Hand Taps.
- All Settings Adjustable To Give Any Angle—Relief—Hook.
- Taps Held In Precision Collets Can Be Sharpened After Center Is Destroyed.
- Standard Motor — Any Current Specification.

Representatives in Principal Cities

Henry P. Boggis & Co.
1277 West 3rd Street
Cleveland 13, Ohio

sorted welding rods, and simplified welding and operating instructions.

Offered in four models designated as the 130B, 130C, 180B, and 180C, the Trindl Limited Input Transformer-Type Arc Welder is recommended for farm, automotive, and general industrial maintenance and production welding. The unit includes 36 foolproof secondary output current heat stages ranging from 20 amperes to its rated maximum secondary outputs of 130 and 180 amperes. Class B



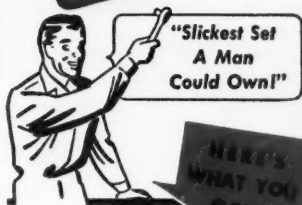
Trindl Model 180B Limited Input Transformer-Type Arc Welder

spunglass type insulation is used throughout. Additional features of the unit include natural ventilation, no moving parts, and sloping vernier-type control panel.

Sidney 25-Inch Heavy Duty Engine Lathe

The accompanying illustration shows a 25-inch heavy duty engine lathe which is now being manufactured by The Sidney Machine Tool Co., Sidney, Ohio. The ma-

Here it is!



(All units $\frac{3}{8}$ " Square Drive)
 $\frac{1}{4}$ " and $\frac{1}{2}$ " Single Broached Sockets
 11—Double Broached Sockets
 from $\frac{3}{8}$ " to $\frac{7}{8}$ "
 1—Speeder Wrench 1—8" Ratchet
 1—Sliding Tee 1—Nut Spinner
 1—Universal Joint
 3", 6", and 12" Extensions
 —Complete in a special metal box
 19 $\frac{1}{2}$ " x 5 $\frac{1}{4}$ " x 1 $\frac{3}{8}$ "



a new Ferret Set by Snap-on

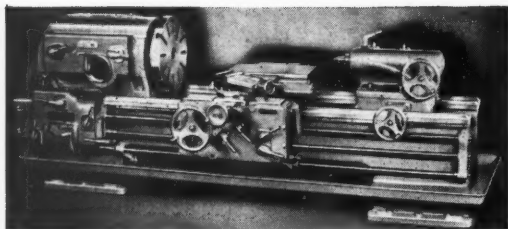
A new design... strong... adaptable...
 they squeeze into close places easily

Yes, a new Ferret Set . . . new in design . . . way over par in performance—and they're twice as strong as you would expect such slim, slender handles and thin-walled sockets to be.

They squeeze into tight places and get those hard-to-reach nuts and bolts that defy the ordinary type wrench. Newly designed by Snap-on engineers, they make quick easy work of many of the tough jobs on modern motors and engines.

Be sure to ask your "Snap-on" man to show this set the next time he calls.

SNAP-ON TOOLS CORPORATION
 8032-A 28th AVENUE KENOSHA, WISCONSIN
 International Division: Kenosha, Wisconsin, U. S. A.



Sidney 25-Inch Heavy Duty Engine Lathe

chine features a 16-speed dial controlled all-herringbone geared headstock. The spindle and intermediate shafts are supported by center bearings in addition to conventional end bearing supports. A rotary pump and filter provide automatic lubrication to all bearings and moving parts.

The gearbox of the machine provides for 48 changes of threads from $\frac{3}{4}$ to 16 and 48 changes of feed from 0.003 to 0.207 inch per revolution of the spindle. The closed exterior design of the gearbox unit excludes dirt and chips.

The lathe bed is provided with four longitudinal walls and double cross girts for rigidity. Hardened and ground tool steel bed ways can be provided on order.

The apron is of double-wall construction, with all shafts rotating on anti-friction bearings. A built-in oil pump and filter provide lubrication to all moving parts and also lubricate the bed ways and cross

slide. For the operator's convenience, the tailstock handwheel is mounted on the side, and a gear reduction unit is provided for positioning the tailstock along the bed.

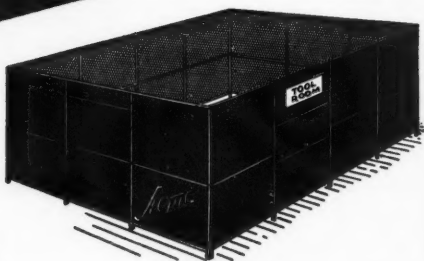
Munton Motorized Hydraulic Press

A motorized hydraulic press which is said to be ideal for manufacturing plants, maintenance shops, repair, welding and body shops, garages, and home workshops in performing straightening, forming, pushing, and numerous other operations is now being offered by the Munton Manufacturing Co., 9400 Belmont

LEADERS FOR HALF A CENTURY

TOOL CRIBS and PARTITIONS

Standard Sections Woven Wire Mesh Panels and Doors to enclose Tool Cribbs, Stock rooms and other enclosures.



IMMEDIATE DELIVERY

Write for Catalog

Acme

WIRE & IRON WORKS

3527 E. CANFIELD

— DETROIT 7, MICH.

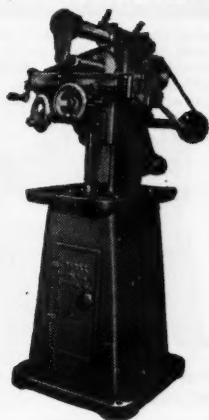
MILLING

BURKE

MACHINES

**Put Your Small, Difficult Work
ON A PRODUCTION BASIS!**

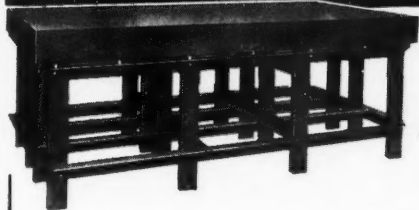
- Burke Milling Machines are fast, economical and indispensable in shops handling small, difficult work.
- 4 Types TO MEET YOUR REQUIREMENTS—Nos. 1, 2, 3, and 4.
- Motor Driven for Fast, Economical Production.
- Timken Roller or Ball Bearings to Spindle.
- A Number of Attachments Available: Vertical Milling Attachment; Index Centers; Vises—3 types, including swivel base.



WRITE FOR COMPLETE INFORMATION

BURKE MACHINE TOOL CO. • 500 Sandusky St., Conneaut, O.

"Precision Equipment by **CHALLENGE**



**MEANS ACCURATE
Trouble-Free PRODUCTION**

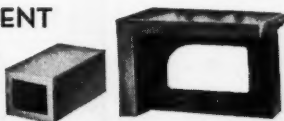
**CHALLENGE Semi-Steel
Layout Surfaces PLATES**

Insure the accuracy of repeated assemblies and layouts. True rigid surfaces of fine grained special analysis semi-steel and with precision ground or planer finish. Deep ribbing of the 6 inch deep plates prevent sagging or yielding under load. Furnished in 13 standard sizes with or without sturdy arc-welded steel stand with lock-leveling screws.

503

CHALLENGE SURFACE PLATE EQUIPMENT

Made of fine-grained special analysis semi-steel castings. Specially heat-treated and precision ground to required accuracy. **SOLID and BOX PARALLELS, ANGLE PLATES, V-BLOCKS and UNIVERSAL IRONS** in a wide range of sizes. Write today for latest Catalog!



THE CHALLENGE MACHINERY CO.

GRAND HAVEN, MICHIGAN, U.S.A.

Heavy Duty • Bench Type

ENGRAVING MACHINE

Interchangeable heads for engraving, electrical marking, and acid etching . . . available for all models. Also Panto engraving cutters, cutter grinders, master copy type, endless belts and accessories.



The PANTO
MODEL UE-3

LIGHTER MODELS UE and UE-2

Catalog
On
Request

H. P. PREIS ENGRAVING MACHINE CO.

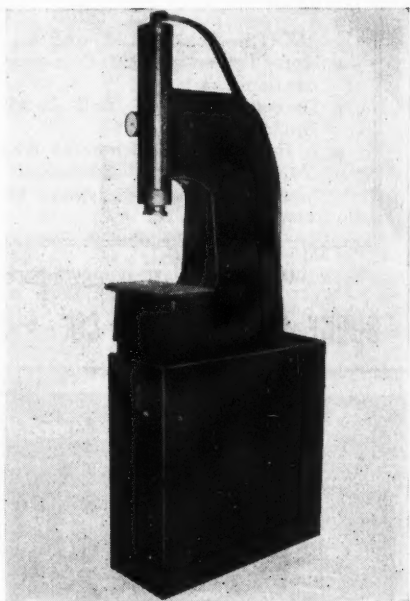
657 Route 29

Hillsdale, N. J.



Ave., Franklin Park, Ill. Powered by a $\frac{1}{4}$ or $\frac{1}{2}$ h.p. 110-volt 60-cycle a.c. motor, the press is available in 3, 5, 7, 10, and 25-ton capacities in both gap and four-post types. The unit is supplied complete ready for plugging into a light socket.

Designed for easy operation, the Munton Motorized Hydraulic Press includes a conveniently located push button which, when depressed, causes the ram of the machine to descend and maintain pressure on the work until a release pedal is



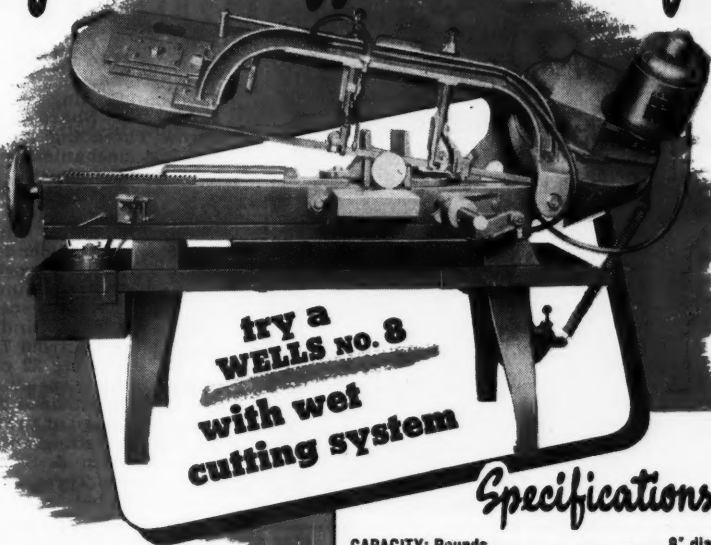
Munton Motorized Hydraulic Press

pressed, at which time the ram returns to its starting position. The accompanying illustration shows a 10-ton gap type model with a 9-inch throat, 10-inch daylight opening, and $7\frac{1}{2}$ -inch stroke. The unit is powered by a $\frac{1}{2}$ h.p. motor.

Brown & Sharpe Automatic Screw Threading Machine

Unusually high production of small screws, nuts, and bushings is said to be obtained with the Brown & Sharpe Automatic Screw Threading Machine illustra-

Is your cut-off time too high?



**try a
WELLS No. 8
with wet
cutting system**

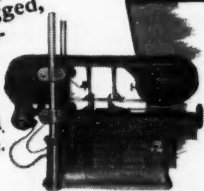
Specifications

WHATEVER the job—rounds, squares, tubing or odd shapes—the Wells No. 8 Metal Cutting Band Saw will hold your cut-off time to a minimum. For production or general utility this saw has the speed, accuracy and versatility to pay for itself. The wet cutting system is an economical extra that makes possible higher cutting speeds and lower operating costs. See your Wells Saw dealer or write for full details.

CAPACITY: Rounds 8" dia.
Rectangular 8" x 16"
With special Guides 5" x 25"
SPEEDS: Selective 60, 90, 130 ft. per min.
MOTOR: ½ H.P. WEIGHT: Approximate 750 lbs.

for HEAVY DUTY jobs the WELLS No. 12

The Wells No. 12 is a rugged, heavy duty saw with a capacity of 12" x 16" rectangular and 12¾" O. D. rounds. It features an automatic cutting cycle and controlled blade pressure.

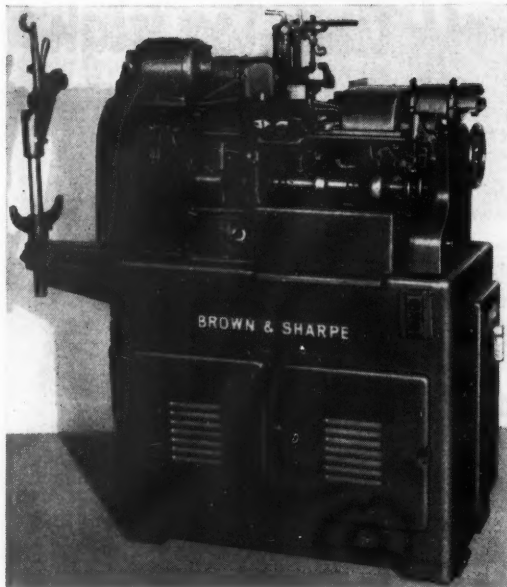


Wells SAWS
THE WAY OF SERVICE SAWS

Wells

Products by Wells are Practical METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
808 TYLER STREET, THREE RIVERS, MICH.



Brown & Sharpe Automatic Screw Threading Machine

bushings, the spindle is used as a drill spindle.

An outstanding feature of the Brown & Sharpe Automatic Screw Threading Machine is a slotting mechanism which provides for the slotting of screws and similar parts. When the machine is used for tapping, the transfer arm of the slotting mechanism provides for drilling of a hole in the work prior to tapping. The machine features die and spindle speeds from 5,000 to 450 r.p.m. and 32 thread spindle speeds from 7,000 to 545 r.p.m., affording 32 changes of thread cutting speeds from 2,000 to 91 r.p.m. provided by the difference in speed of the work spindle and threading spindle.

The Brown & Sharpe Automatic Screw Threading Machine is constructed to accommodate stock up to $\frac{3}{8}$ inch in diameter and is designed to thread any length up to 1 inch. The maximum distance from the front of the chuck to the face of the die is $2\frac{1}{2}$ inches and the minimum distance is $\frac{1}{8}$ inch. Various attachments are available for the machine, thus making it possible to perform auxiliary operations in unison with the main operations.

ted herewith, product of the Brown & Sharpe Manufacturing Co., Providence 1, R. I. The machine is specifically designed to take full advantage of overlapping operations and to reduce idle time to a minimum.

Both the work spindle and threading spindle of the machine rotate in the same direction but at different speeds. The difference in speeds permits the die or tap to cut at the required surface speed for threading while the work rotates at a suitable speed for turning or other operations. Threading dies can be backed off simply by automatically stopping the threading spindle. For the production of

Parkson Improved Gear Tester

According to an announcement made by the George Scherr Co., Inc., 198-A Lafayette St., New York 12, N. Y., the 9-

Faster Tube and Pipe Cutting

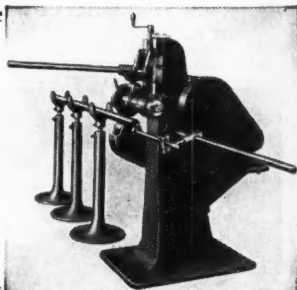
STEEN High-Speed pipe, tube and column cut-off machines embody unique design and rigid construction features to greatly step up cut-off operations. Available in three sizes to cut diameters $\frac{1}{2}$ " to 3"; $\frac{1}{2}$ " to 6"; 3" to 12".

WRITE FOR CIRCULAR TODAY

CONTINENTAL MACHINE COMPANY

1952 Maud Ave.

Chicago 14, Ill.



ROGERS

PATENT ADJUSTABLE HOLLOW MILLING TOOL

Quickly and easily adjusted — rugged in construction — rigidly locked when on the job.

Carbide tipped blades optional, are quickly interchanged with the high speed steel blades, for cutting the harder or gritty materials.

The Rogers 61 years experience in Special Tool Design is always available to your firm.

Write for catalog

THE JOHN M. ROGERS TOOL CORP.

Gloucester City

New Jersey

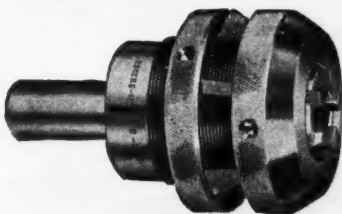


Fig. 20—Shank Integral

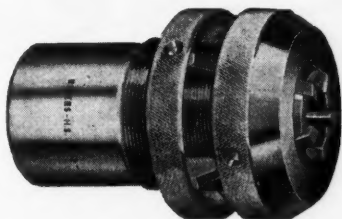


Fig. 23—Arbor Separate

NEW DRILLS FROM OLD WITH NU-TANGS

**NU-TANGS
CUT DRILL
REPLACEMENT
COSTS!**

OLD METHOD

NEW METHOD

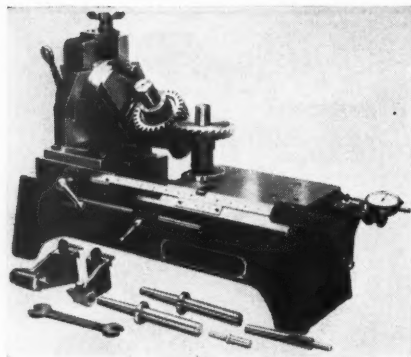
Send us your old drills—we'll make them new again at a fraction of the cost of a new drill! Exclusive NU-TANG* process replaces twisted or broken tangs with brand new tangs of correct size — and with **GUARANTEED ORIGINAL STRENGTH.** No welding—No distortion—No shortening of drills—No sleeves.

Any drill, reamer, or other tool with a Morse taper in sizes 2 to 6 can be repaired perfectly this quick new way. Delivery—One week. Used by many leading industrial plants. Amazingly low cost—satisfaction guaranteed! Send for complete information.
*Patent Pending.

NU-TANGS INC.

1337 Bates Street
Cincinnati 25, Ohio

*write
today*



Parkson Improved Gear Tester

inch Parkson Gear Tester which it has been distributing has been completely redesigned by streamlining the base as well as other main parts and by making changes that provide for more efficient operation of the unit.

An outstanding feature of the improved tester is an adjustable stop rod which is used in addition to the precision scale

and long vernier for the setting of the center distance of the tester. However, when a number of gears of the same size are to be tested, the scale setting need not be repeated. Instead, the stop rod is set and clamped in position. To change the setup, the left-hand slide is moved out of the way, the gears on the arbor are replaced, and the slide is then quickly and positively brought back into the same position against the stop.

The accompanying illustration shows the Parkson Improved Gear Tester set up for checking spiral gears, however, it is also available for spur, bevel, and worm gears, either in combination or single-purpose models.

DoAll "Cool Grinding" Coolant Injecting System

A system whereby coolant is injected directly at the point of contact between the wheel and the work is now being offered under the name of "Cool Grinding" by the DoAll Co., Des Plaines, Ill. The system consists of a coolant reservoir which is mounted on the spindle column, a sight drip valve, and a special wheel adapter. The coolant is fed from the res-

Attention! SHOP FOREMEN specify **HALLowell**

Here is a "Hallowell" Foreman's Desk of Steel—of stand-up height. The top of just the right size and sloped at just the right angle, provides a flat, smooth writing surface. It enables foremen to do necessary desk work and file their cards, records, etc. for ready reference in conveniently located pigeon holes. Many other styles are available to meet your specific requirements. Write now for the "Hallowell" Catalog of Shop Equipment of Steel.

"Hallowell" Products are sold entirely through
Industrial Distributors

OVER 45 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.

JENKINTOWN, PA.

BOX 556

Boston • Chicago • Detroit • Indianapolis • St. Louis • San Francisco

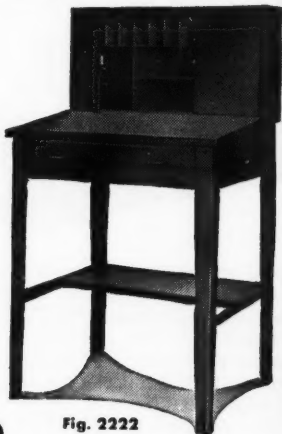


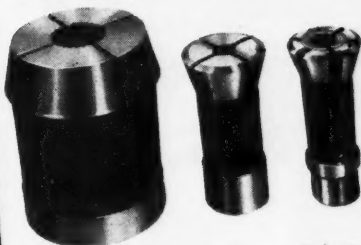
Fig. 2222

IN
OUR

25th

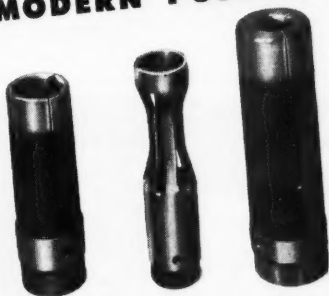
ANNIVERSARY
YEAR

MODERN COLLETS



For all machines—all types and sizes,
solid and master—special collets
for every purpose—since 1922.

MODERN PUSHERS



For all automatic and hand screw
machines—all types and sizes,
solid and master.

MODERN CAMS

For all Grid-
ley and sim-
ilar auto-
matics—non-
warping and
long-lasting
—made of



alloy steel with flame-hardened face.

Also SCREW MACHINE
GEARS AND REPLACEMENT
PARTS—SCREW MACHINE
REBUILDING

For 25 years America's leading independent
manufacturer of collets, pushers and screw
machine replacement parts.

Write for CATALOG 47



MODERN COLLET & MACHINE CO.

403 SALLIOTTE STREET • ECORSE 18, MICHIGAN



DoAll "Cool Grinding" Coolant-Injecting System

ervoir at a rate of from 1 to 4 drops a second, depending upon the material being ground. The coolant is directed into the

front of the special wheel adapter where it enters the arbor hole of the grinding wheel. Since the grinding wheels used in Cool Grinding have no lead or ceramic, the coolant enters the wheel at the inside and is thrown by centrifugal force to the outside surface of the wheel.

In addition to virtually eliminating surface cracks, the DoAll Cool Grinding System is also claimed to flush the grinding surface and keep it clean, thus resulting in unusually long wheel life and the production of high quality finishes, especially in softer materials such as copper, bronze, aluminum, and so on. The system is available at the present time as an attachment for DoAll 6 x 18-inch surface grinders, however, it will soon be offered for other makes of surface grinders, as well as for bench, cylindrical, centerless, and internal grinders. The system is supplied complete with special coolant and grinding wheels without lead bushings.

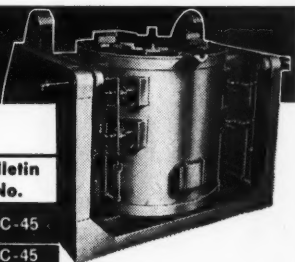
Strand "Rotoflex" 4-Speed Gear Drive Flexible Shaft Machine

For use in performing grinding, buffing, polishing, sanding, drilling, reaming, rotary filing, wire brushing, screw driving, nut setting, rasping, and many other op-

NON-FERROUS METAL MELTING FURNACES

SELECTION TABLE

| | TYPE | Max. Temp. | Series | Recommended for | Bulletin No. |
|------------|----------|------------|--------|--------------------------------|--------------|
| TILTING | CRUCIBLE | 2500°F. | TCR | Melting Brass and Copper | TC-45 |
| | | 1400°F. | TCA | Melting Aluminum | TC-45 |
| | POT | 1400°F. | TP | Melting Aluminum and Magnesium | TP-45 |
| STATIONARY | CRUCIBLE | 2500°F. | CR | Melting Brass and Copper | CR-45 |
| | | 1400°F. | AC | Melting Aluminum | AC-45 |
| | | 1400°F. | AM | Melting Aluminum | AM-45 |
| | POT | 1200°F. | SM | Melting Soft Metals | AM-45 |
| | | 1000°F. | SA SAV | Melting Soft Metals | SV-45 |



'Surface'

Standard Rated FURNACES

SURFACE COMBUSTION CORPORATION, TOLEDO 1, OHIO

WRITE FOR COMPLETE SPECIFICATIONS

2634B -1

SIMPLE — FAST — ACCURATE LOCATING



SIMPLE

Place instrument in spindle of boring mill (vertical or horizontal), drill press or jig borer.

FAST

200 - 1000 r. p. m. Bring thumb nail to bear against centering bead until it runs true. Stop machine and focus on work. Keep eye at least 4 inches from viewing aperture.

ACCURATE

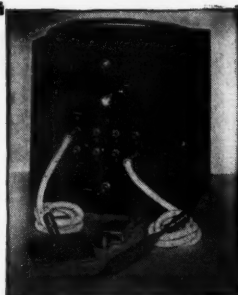
Locate cross lines on work to match lines in viewing aperture.

Write for
catalogue No. 12

CENTER SCOPE PRODUCTS

3829 San Fernando Rd., Glendale 4, Calif.

MARK IRON, STEEL and CARBIDES



THE
Etchograph
WAY

Original Electric Etcher. Thousands in Daily Use

Mark hardened parts, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides — quickly — plainly. • Three sizes to meet all requirements.

• Write for circulars and prices.

BREWSTER-SQUIRES CO.

Hudson Terminal Bldg. New York 7, N. Y.

Speed—POWER—PRECISION

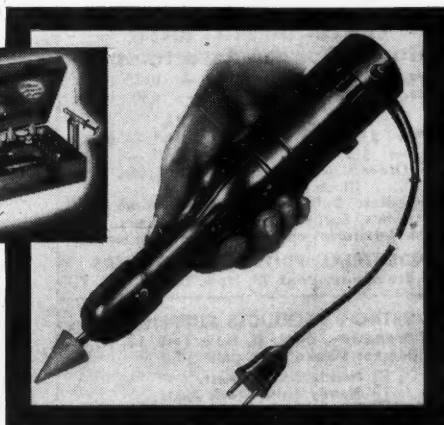
40,000 R.P.M.—1/5 H.P.

Built for production. PRECISE 40, the fastest, most powerful electric handtool made, weighs only 40 oz. Use on any material from file-hard steel to bronze, plastics, wood or rubber. Imagine, with tungsten carbide cutters PRECISE 40 mills the hardest steel!

PRECISE 40 in cool, shock-proof, plastic case operates on AC-DC. Use it as a handtool or as a motorized quill in vise, lathe, mill or on your production set-up. Many accessories and rotary tools available. Also COOL-FLEX Flexible Shaft attachment with 9-oz. air-cooled handpiece.



GRINDS
MILLS
DEBURRS
ENGRAVES
POLISHES
FINISHES



► WRITE FOR BULLETIN

PRECISE 40

PRECISE PRODUCTS COMPANY

1345 CLARK STREET • RACINE, WISCONSIN

ARTUS PLASTIC SHIM

AND
FEELER
GAUGE
STOCK



The **COLOR**
tells the
THICKNESS

• Each thickness a distinctive, easy to identify color. Impervious to oil. Long lasting 5"x20" sheets. Special sizes to order. Handy assortment, shim stock, 12 colors—12 thicknesses (.001-.030). Bound together.....\$4.25

ARTUS ARBOR SPACERS



The **COLOR** tells
the **THICKNESS**

ARTUS Arbor Spacers made of plastic in various colors identify thickness at a glance! .001, .0015, .002, .003, .005, .0075, .010-.030. Speed up accurate fitting at low cost. Write for folder.

CONVENIENT TRIAL OFFER

Handy Spacer Assortment

| | |
|--------|--------------------|
| 10 ea. | .001 — .0125 thick |
| 5 ea. | .015 — .030 thick |

100 SPACERS IN ALL

| | |
|---------------|-----------------|
| 7/8" — \$3.10 | 1 1/4" — \$3.80 |
| 1" — 3.35 | 1 1/2" — 4.70 |

Other standard sizes also available.

Illustrated Folder Free.

Immediate Delivery on Spacers, Gaskets, Shims, Large Slitting Saw Spacers.

A few territories open for active distributors.

INDUSTRIAL PRODUCTS SUPPLIERS

434 Broadway, Dept. M, New York 13, N. Y.

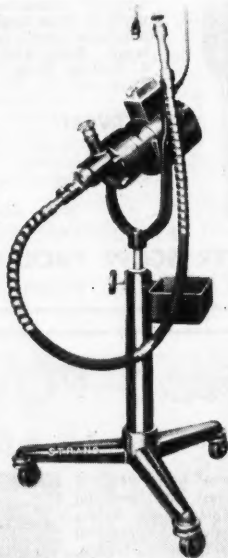
INDUSTRIAL PRODUCTS SUPPLIERS

434 Broadway, Dept. M, New York 13, N. Y.
Gentlemen: Please send me:

- ☐ Handy Spacer Asst.
☐ Handy Shim Stock Asst.
☐ Free Illustrated Literature

NAME
COMPANY
STREET
CITY STATE

erations, N. A. Strand & Co., 5006 N. Wolcott Ave., Chicago 40, Ill., has placed on the market a 4-speed gear drive flexible shaft machine designated as the "Rotoflex." The machine employs a patented quick-change gear drive, utilizing four positive speeds by a unique and easy method of instantly changing from one speed to another. The drive features two sets of helical cut hardened steel gears operating in lubrication. By means of an eccentric driving shaft sleeve assembly, one or more master gears may be engaged by a slight rotary motion as well

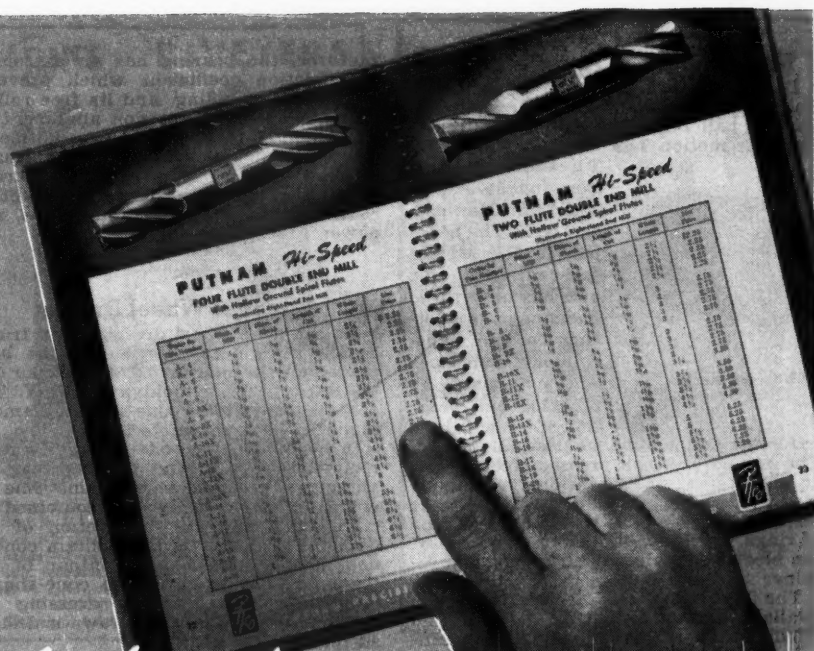


Strand "Rotoflex" 4-Speed Gear Drive
Flexible Shaft Machine

as axial movement of the sleeve for several different speeds.

The driving unit of the Strand Rotoflex Machine consists of a totally enclosed ball bearing electric motor with totally enclosed gear housing operating in oil, plus an enclosed grit-proof switch to eliminate any possibility of dirt, grit, and foreign particles reaching any vital parts of the machine. The Rotoflex is available in bench, floor, and vertical types having standard speeds of 850, 1,800, 3,600, and 4,500 r.p.m. When equipped with a 3,450 r.p.m. motor, speeds of 1,700, 3,600, 7,200, and 9,000 r.p.m. can be obtained.

N.
ac-
ive
the
at-
ing
asy
one
two
ars
of
m-
be
vell



Looking for an END MILL?

THE exact tool you need is in the Putnam catalog along with over 800 other different types and sizes of end mills Putnam manufactures and supplies for your milling production requirements. All are standard, catalog-priced items—all are regularly stocked at Putnam Distributors for immediate delivery to you.

If you are a user or a buyer of end mills, send for your copy of new, complete Putnam catalog...free!



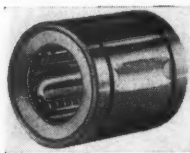
PUTNAM

2985 CHARLEVOIX AVENUE • DETROIT 7, MICHIGAN

ev-
oto-
sed
ully
oil,
ell-
and
rts
ail-
pes
300,
n a
300,

Thomson Series A Ball Bushing

Designated as the Thomson Series A Ball Bushing, an unlimited travel anti-friction ball bearing for linear or reciprocating motion has been developed by



Thomson Series A
Ball Bushing

Thomson Industries, Inc., 1029 Plan-dome Rd., Manhas-set, N.Y. The bearing is a complete self-contained unit and has only three basic parts in addition to the balls. One part comprises a sleeve made up of 52100 ball bearing steel which is

hardened and ground to close tolerances. The second part is a pressed steel retainer which is fabricated in long continuous strips that are cut off and rolled up to fit inside the sleeve. The third part is a pair of rings which are pressed in the ends of the sleeve to position and secure the retainer to the sleeve.

The Thomson Series A Ball Bushing is available for shafts having $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and 1-inch diameters. According to the manu-

facturer, the bearing has an extremely low friction coefficient which prevents cocking and binding, and its free rolling action maintains precision alignment by the elimination of wear. In addition to effecting economies in the design of many mechanisms and machines, the bearing, it is claimed, can be effectively used to reduce maintenance, starting loads, and power consumption.

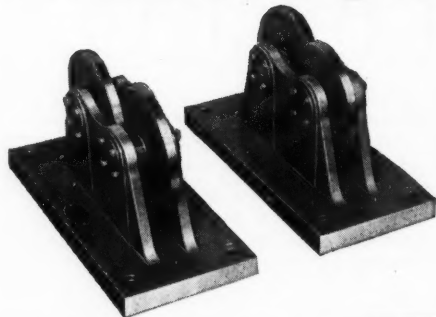
Conetrol Wheel Dresser

An abrasive wheel dressing and truing device known as "Conetrol" has been placed on the market by The Finke Co., 449 Senator St., Brooklyn 20, N. Y. The device consists of a cone-shaped diamond mounted on a rotatable base.

In operation, the cone-shaped diamond reciprocates back and forth across the abrasive wheel and at the same time revolves in its mounting. The combined reciprocating and rotating action of the diamond is thus said to maintain continuously the cone-shaped contour of the diamond. The apex of the cone-shaped diamond is designed for dressing the abrasive wheel while the crown is designed for finish truing.

PILLOW BLOCK BALANCING WAYS

Especially suited for large diameter work, as a sub-base can be made of proper height to give necessary clearance for work. Anderson Pillow Block Balancing Ways are precision built with chilled iron discs which rotate with minimum friction on sensitive special bearings. Many manufacturers have endorsed them for profitable, efficient, static balancing.



**Built in 1000, 2000, 5000, 10,000
and 20,000 Capacities**

Send for Bulletin 1-22

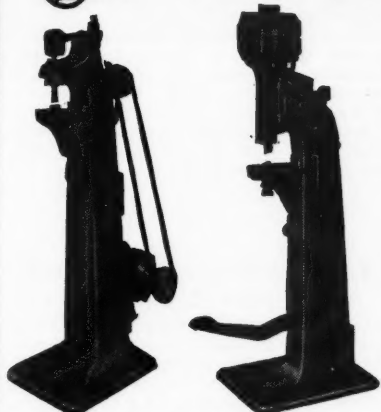
ANDERSON BROS. MFG. CO., Rockford, Ill.

**Balancing Ways, Roto Checkers, Hand and Power Scrapers,
Spotters, Hand and Power Hydraulic Straightening Presses.**



GRANT

RIVETERS



• Pioneers in the riveting field. Head rivets from smallest to $\frac{1}{4}$ " diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

THE GRANT MFG. & MACHINE CO.
96 Stillman Ave. Bridgeport 3, Conn.

**Why Use A Shaper
to cut Keyways when a**

**DAVIS
KEYSEATER**

**will do the
job so much
quicker
and
better?**

Send
for
Circular



DAVIS KEYSEATER CO.

Exchange and Glasgow Sts.
ROCHESTER, N. Y.

SPECIAL SMALL EQUIPMENT

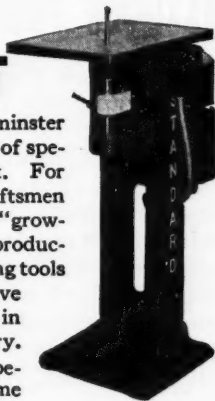


Optical Turning Lathe

Representatives
**LESTER Injection
Molding Machines**

Ask Standard Tool of Leominster to help solve your problem of specially designed equipment. For more than 36 years, our craftsmen have concentrated on the "growing" problems of plastics production, designing and producing tools and equipment that have played an important part in the success of this industry.

This knowledge and experience can help you save time and cut costs without reducing the quality of your product.



Motorized Ball
Bearing Beveler

STANDARD TOOL CO. LEOMINSTER, MASS., U.S.A.

OUTFITTERS TO PLASTIC MANUFACTURERS SINCE 1911

Specialists in designing and building Plastic Molds



Atlas Improved Chipping Hammer

An improvement in the construction of its chipping hammer is announced by the Atlas Welding Accessories Co., 707 E.



Atlas Improved Chipping Hammer

Lewiston, Ferndale (Detroit), Mich. The hand forged head of the hammer is now drilled half way through and the handle silver brazed into the hole. The end of the handle is machined to fit the base of the drilled hole so that the silver flows over the entire surface of the hole, thus cementing the handle to the head. For-

merly, the hole was drilled all the way through the head and the handle arc welded at the end.

According to the manufacturer, the improved design of the Atlas Chipping Hammer provides for a stronger and smoother construction. The handle includes a coil wire feature which is said to provide a positive slip-proof and sting-proof grip and to eliminate danger of burning the user's hand.

Threadwell Self-Oiling Ratchet Pipe Threader

A ratchet pipe threader with self-oiling feature is announced by the Threadwell Tap and Die Co., Greenfield, Mass. With the unit, a full day's supply of oil is contained in the handle, and the dies may be oiled while in use by simply pressing the plunger at the end of the handle. As a result, cutting operations are said to be performed easily and with minimum effort.

An additional feature of the Threadwell Self-Oiling Ratchet Pipe Threader is the locating of the dies in direct line with the handle. This construction is said

MAXIMUM PRODUCTION IN CHUCKING AND INDEXING

With the new Dearborn Automatic Indexer connected to a Dearborn Chucking Fixture: chuck is closed automatically; indexed the required number of times automatically; chuck is opened automatically; piece is knocked out automatically.



Write for further information.

When used with the Dearborn Degree Indexing Fixture it can quickly be set to index any number of degrees from 30° to 90° at one indexing and then knock out, or it can be set to index from no degrees to 90° and then not knock out.

J. W. DEARBORN

Ansonia, Conn.

How LONG-

SINCE YOU'VE
WRITTEN OFF YOUR OLD
DRILLING MACHINES?

MODEL C-20 SIBLEY 20" SWING DRILLING MACHINE

Many manufacturers are operating old drilling machines whose costs were written off years ago. Now obsolete in speed, accuracy and efficiency, they are a decided handicap in paring costs to offset higher labor rates.

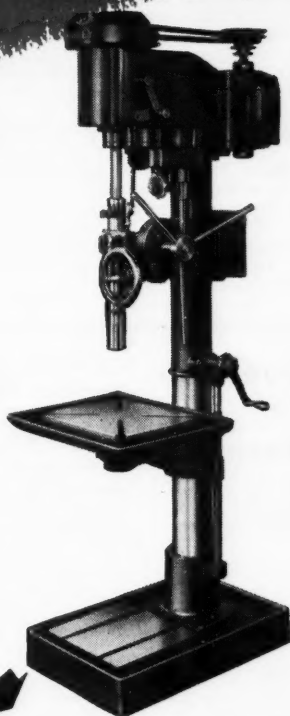
Install a new Sibley and compare with your present equipment. See the advantage of easy access to controls—where you turn a knob to select the proper geared power feed; convenient shifting of V-belt; power to drill 1½" in mild steel; 8 spindle speeds from 65 to 1360 R.P.M. powered by a 2 H.P. motor.

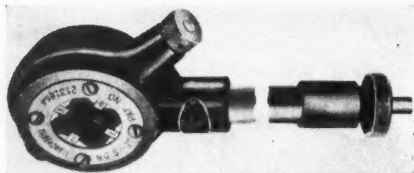
GET COMPLETE INFORMATION ON THE
SIBLEY MODEL C-20

SIBLEY
MACHINE & FOUNDRY CORP.
30 EAST TUTT STREET
SOUTH BEND 23, INDIANA

SIBLEY MACHINE & FOUNDRY CORP.
30 E. Tutt St., South Bend 23, Indiana
Send Catalog No. 67, Free!

NAME _____
ADDRESS _____
CITY _____ STATE _____





Threadwell Self-Oiling Ratchet Pipe Threader

to result in easy operation without the possibility of twisting action and with true starting, smooth cutting, and long die life. In addition, the threading of unusually short close-coupled nipples is claimed to be possible.

The threader is equipped with specially heat-treated tool steel dies designed with radial clearance for extra smooth operation. The die heads may be instantly changed by pulling a knob on the ratchet pawl. The die segments are readily replaceable. The jet of oil applied while cutting threads is claimed to increase the life of the dies by as much as 150 per cent.

The Threadwell Self-Oiling Ratchet Pipe Threader can be obtained with die heads from $\frac{1}{8}$ through $1\frac{1}{4}$ inches with right-hand dies.

Micro Miniature End Mill

To meet the need for a small metal cutting tool that would produce accurate results on difficult production runs, as well as in the toolroom, the Woodson Tool Co., Inc., 4811½ W. Lennox Blvd., Inglewood, Calif., has developed the Micro Miniature End Mill. The tool is claimed to be particularly useful for manufactured parts and work requiring small end mill operations, such as milling, engraving, routing, and profiling.

According to the manufacturer, the Micro Miniature End Mill possesses unusual strength, sharpness, and durability. All grinding operations are performed after the steel has been properly heat treated. The radial clearance is curved, and the grinding lines are parallel to the cutting edges. Use of the mill is said to reduce tool breakage and down time on machines to a minimum.

Glengarry Model GA1 High Speed Derodder

For the purpose of relieving metal tubing that has been drawn by means of a mandrel in order that the mandrel may

Question:

HOW TO STOP PRODUCTION LOSSES from misalignment, teardowns for replacement, vibration, backlash, power loss, and lubrication difficulties.

Answer:

INSURE FULL, TRUE, SMOOTH POWER FLOW from old or new equipment with Lovejoy Flexible Couplings. Types and sizes for every duty from 1/6 to 2500 h.p. Send for Quick-Finding Selector Chart with complete engineering data, prices, weights, etc. Every engineer should have one. WRITE TODAY for chart and catalog.



TYPE "C." PAT. & PATS. PENDING.

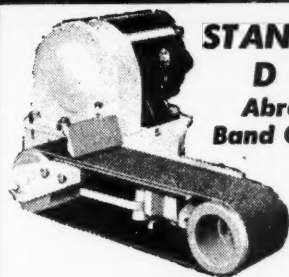
Write to:

**LOVEJOY
FLEXIBLE COUPLING COMPANY**

5007 W. LAKE ST.

CHICAGO 44, ILLINOIS

Mfrs. of Lovejoy-IDEAL Variable Speed Controls



STANDARD D - 4 Abrasive Band Grinder

Famous
for
Stamina

This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x36 1/4" band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW
MANUAL ON FINISHING—WRITE TODAY

WALLS SALES CORP.
306 E. 38th St., New York 16, N. Y.

"OLIVER" 38-inch Metal Cutting BAND SAW

Available with high or slow speeds for cutting risers, gates, sprues, heavy or light sections of metals, sheet metals. Also wood and composition.

Powerful—cuts true and steady.

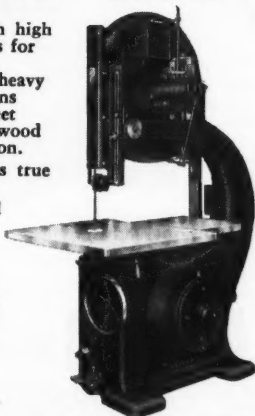
Can be placed on floor—no pit required.

Quick-Change Rim and Tire.

Saw tension automatically indicated.

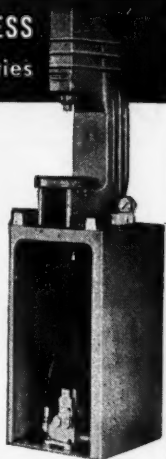
Write for
Bulletin 115-S.

Oliver Machinery Co., Grand Rapids 2, Mich.



AIR-HYDRAULIC PRESS 2 1/2 & 6 Ton Capacities

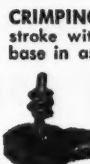
ASSEMBLING
BROACHING
RIVETING
STAKING
CRIMPING
TRIMMING
MARKING
SHAPING



NO OTHER PRESS
DOES SO MANY JOBS SO WELL!



ASSEMBLING—Laminations and rivets squeezed at one stroke. Steady controlled pressure prevents distortion.



CRIMPING—4 crimps made at one stroke with no damage to plastic base in assembly of radio tube.



ASSEMBLING—Worm pressed over knurled spindle on vention blind hardware.



BROACHING—8 slots broached at one stroke on plastic base. Broaching, slotting and piercing operations on plastics performed easily on A-H Press.



RIVETING—3 tubular rivets in ceramic base "squeezed with speed" at one stroke. Eliminates danger of damage to ceramic.



FORMING—Field coil squeezed into concave shape from flat. Only a squeeze assures perfect, uniform work, free of tape breakage.



STAKING—Multiple staking operation on metal and bakelite radio volume control.

Exclusive Dealership Available

Write for our new Illustrated Brochure.

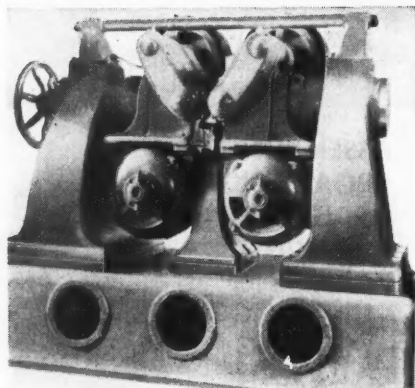


AIR-HYDRAULICS, INC.

Factory CHESLEY, MICHIGAN

— Sales Office: 401-C Broadway, N. Y. 13 —

MODERN MACHINE SHOP 275



Glengarry Model GA1 High Speed Derodder

be readily removed from the tubing, the Glengarry Machine Works, Inc., Bay Shore, N. Y., is now offering the Glengarry Model GA1 High Speed Derodder shown in the accompanying illustration. The machine, operating at speeds up to

120 feet per minute, is designed to handle ferrous tubing in sizes up to $\frac{7}{8}$ inch in diameter with wall thicknesses up to 0.065 inch, and non-ferrous tubing in diameters up to 1 inch.

The transmission of the machine operates in oil to ensure long trouble-free service. Once set, the simple micrometer adjustments on the unit are said to require no further attention. For light work, especially on irregular lengths of tubing, the tie bar can be quickly removed. The compact design of the machine allows for easy installation.

Kaukauna No. 1030 Portable Horizontal Drilling and Tapping Machine

The Kaukauna Machine Corp., Kaukauna, Wis., announces a portable horizontal drilling and tapping machine with a tilting horizontal head for use in performing an unlimited number of drilling and tapping operations. The compactness and portability of the machine, which is designated as the No. 1030, are said to afford an easy approach to the work, thereby simplifying many difficult ma-



...they don't yawn
any more

They couldn't see why we emphasize our rigid alloy requirements—controlled heat treatment—exact machine work—all normal procedure in making gears for Thriftmaster Drillheads.

Then they ran into gear trouble in the heads being used in their own plants. Enforced work stoppages and reduced output sent costs soaring upward.

Then they began to listen. They let us prove what a soundly constructed drillhead with hardened gears and spindles can do. Now they specify Thriftmaster for all Multiple Drillhead requirements.

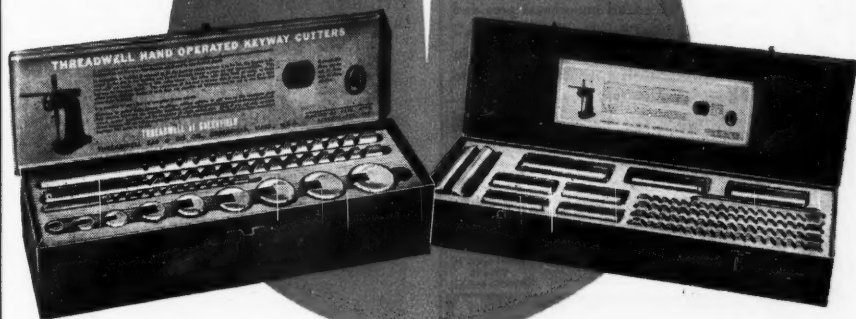
For complete engineering information, write to: Engineering Department, Thriftmaster Products Corporation, 1048 N. Plum St., Lancaster, Pa.



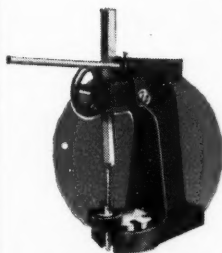
THRIFTMASTER
Multiple Spindle Drillheads

ROUND OUT YOUR TOOL CRIB

Cuts keyways for you in one minute



WITH ONE OF THESE *Threadwell* KEYWAY CUTTER SETS



Need a Threadwell Arbor Press to go with your Keyway Cutter Set and for general service around the shop? Ask your Threadwell Distributor to show you this light, strong, inexpensive Press. Takes work up to 14" dia. Hand lever—age 48 to 1.

*Delivery on standard items
now being made from stock*

SOLD EXCLUSIVELY BY MILL SUPPLY DISTRIBUTORS
THROUGHOUT THE UNITED STATES AND THE WORLD

THREADWELL

TAP AND DIE COMPANY • GREENFIELD, MASSACHUSETTS, U. S. A

CALIFORNIA OFFICE, THREADWELL TAP & DIE CO. OF CALIF., 1322 SANTA FE AVE., LOS ANGELES 21

Threadwell
"TOOLS OF DISTINCTION"

When you want a keyway in a gear, a collar, a coupling, a milling cutter, a pulley hub — you want it *now*, not dollars and hours later.

When you have this Threadwell Set all you do is drop the right bushing in the bore, insert the cutter of the desired keyway width in the bushing slot, press it through once, and again with shim to get the exact depth, and you're done — in less time than it takes to tell!

Here's one of the greatest little time and money savers in the shop. A few keyways and it's paid for itself.

Made to the same standards of quality and precision as Threadwell Taps and Tools of Distinction.

Immediate Delivery FROM STOCK

GREAVES-SILENT BAKELITE GEARS



No waiting when you order Greaves Silent Bakelite Gears. • We have them in stock NOW! • Your order will go forward immediately. • You'll appreciate the silent operation and added smoothness provided by Greaves Silent Bakelite Gears. • You'll marvel at their great strength to carry big power loads . . . their remarkable ability to successfully operate completely submerged in water. • You'll welcome their low cost. • No metal reinforcements required. • Save Time . . . Money . . . Labor!

We also make silent gears of rawhide and Fabrolite.

Write for Circular.



Greaves MACHINE TOOL CO.

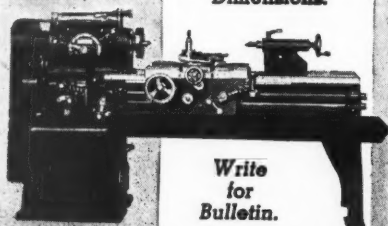
2015-33 Eastern Ave.
Cincinnati, Ohio

CARROLL AND JAMIESON LATHES

16"

12 Speed Geared
Head Motor Drive
Timken Mounted
Spindle.

Modern Design—
Liberal
Dimensions.

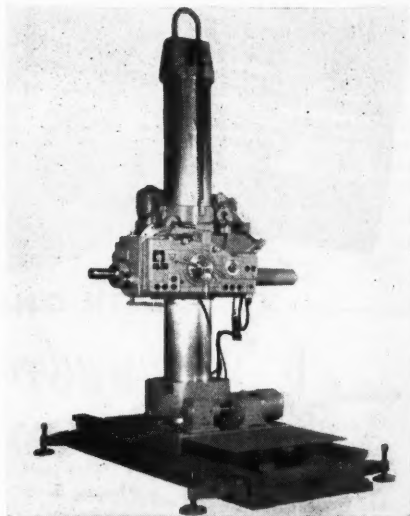


Write
for
Bulletin.

**THE CARROLL & JAMIESON
MACHINE TOOL CO.**

chining operations. Full three-dimensional power traverse and swiveling of the headstock allow for the practical performance of drilling and tapping operations throughout a range of 45 deg. above or below the horizontal spindle position.

Maximum application and performance are claimed to be assured by the speed and feed ranges and machine movements for work from a wide variety of positions. The machine spindle can be placed in virtually any position for drilling and tapping through (1) the power elevation



**Kaukauna No. 1030 Portable Horizontal
Drilling and Tapping Machine**

of the headstock on the column, (2) the column and sub-base power traverse on the runway, (3) the tilting of the headstock 45 deg. above and below the horizontal, and (4) the rotation of the column 360 deg. on its sub-base.

Additional features of the machine include a fine feed to the spindle through a micrometer handwheel; adjustable calibrated depth gage with automatic trip which throws out the feed at any predetermined depth within 6 inches of spindle travel, the starting point being anywhere within the total spindle traverse; single lever control for three feeds; rotary selector lever with indicating dial for speed changes; automatic tapping de-

OPTICS FOR GRINDING

Check YOUR CARBIDE
TOOL ANGLES
with



OPTI-CHECK

- Magnifies Tool
- Magnifies Reading
- No Fussy Juggling
- Accuracy $\frac{1}{4}$ Degree • Makes Duplication of Sharpening Angles Easy.
- Checks Drills, Cutters, etc.

Write

THE BENTON CO.

DEPT. M, 351 S. LA BREA, LOS ANGELES, CALIF

MARK and DEMAGNETIZE IN ONE OPERATION

THE
Luma
WAY



The Luma combination etch tool and demagnetizer, etches, demagnetizes, anneals and solders. Permanently marks hardest steel with ease of a pencil. Write for complete information.

Luma Electric Equipment Co.

P. O. BOX 132-MS

TOLEDO 1, OHIO

"The Outstanding Basic Improvement in FLEXIBLE SHAFT Machinery in 25 Years"

The NEW Strand Rotoflex 4-speed gear drive Flexible Shaft Machine (shown upper right) is another step forward in Strand quality precision tools for faster, easier, more economical production work. The Rotoflex 4-speed gear drive employs a patented, new type of quick change gear drive utilizing 4 positive speeds by a unique and easy method of instantly changing from one speed to another. Rotoflex machines are powered with totally enclosed ball-bearing motors having speeds from 850 to 9000 R.P.M., depending on motor.

Standard type Strand machines, (lower right) give portable rotary power at constant speeds with dependable results in all grinding, buffing, drilling, wire brushing and rotary filing operations. Hundreds of types and models from $\frac{1}{8}$ to 3 H.P. available with suitable attachments for your specific requirements.

Distributors in all principal cities

Ask for Bulletin No. 43 and Catalog No. 30



N. A. STRAND & CO.

5006 NO. WOLCOTT AVE.
CHICAGO 40, ILL.

GSY-5



M-5

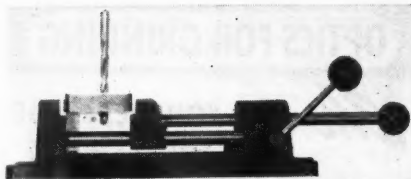


vice with adjustable dial for tapping to a depth of 5 inches; selector switch for either right or left spindle rotation; full tapping cycle complete with each depression of push-button control; positive locking clamps which, when engaged, prevent unit movements; and lifting bail to facilitate handling of the machine with an overhead crane.

The Kaukauna No. 1030 Portable Horizontal Drilling and Tapping Machine has a capacity of 3 inches in cast iron with a 3-inch diameter spindle; 9 spindle speeds; 3 spindle feeds; 24-inch longitudinal continuous travel of the spindle; and 48-inch horizontal travel of the column on the runway.

Hartmann "600" Drill Press Vice

Designated as the "600," a 6-inch drill press vice which operates through direct lever action on a push lock is announced by Industrial Enterprises, Inc., Dept. MM, 201 Sixth St., Racine, Wis. An outstanding feature of the vise is the patented locking mechanism which compensates for wear. The locking lever arm, engaging on a hardened cam pivoting in a collar on an eccentric, bears forward grip-



Hartmann "600" Drill Press Vice

ping pressure on a rod (hardened to Rockwell C62-65 and precision ground) which is thereby pushed ahead, exerting pressure on the jaws and locking the work in position.

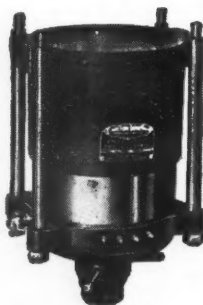
The Hartmann 600 Drill Press Vice is precision built and has a lettuce green crackle finish to fit into modern shop color dynamics.

Maxwell Ratio Recessing Tool

A ratio recessing tool which is especially designed for operation on high speed automatic machines in performing grooving, backfacing, and recessing operations

DIE CUSHIONS THAT MODERNIZE YOUR DIE CONSTRUCTION AND DESIGN

Adaptable to All Deep Drawing Press Operations



| | | | | | | | |
|----------------------|----|-----|-----|-----|-----|-----|------|
| Cushion Size..... | 5" | 6" | 8" | 10" | 12" | 14" | 16" |
| Maximum Draw..... | 2" | 2½" | 3" | 3" | 3" | 4" | 5" |
| Maximum Tonnage..... | 9 | 1.4 | 2.5 | 3.9 | 5.7 | 7.7 | 10.0 |

A cushion model and size for every press requirement.

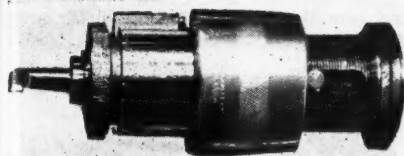
Die cushions with hardened and ground pin pressure pad which can be used to an advantage on all pressure pad controls on a large percentage of your forming dies.

WRITE FOR CATALOG

No. 100-12

DAYTON ROGERS
Manufacturing Company

MINNEAPOLIS 7, MINNESOTA



Maxwell Ratio Recessing Tool

with maximum accuracy is announced by The Maxwell Co., 325 Broadway, Bedford, Ohio. The cutter of the tool moves in a radial direction in a predetermined ratio ranging from three to eight times slower than the forward movement of the spindle so as to maintain the proper cutting feed.

The Maxwell Ratio Recessing Tool is available in four standard sizes for grooving, backfacing, and recessing holes ranging from $\frac{3}{8}$ to 4 inches in diameter. The tool utilizes standard size shanks of 1, $1\frac{1}{2}$, and 2 inches, with all the shanks interchangeable. According to the manufacturer, multiple cuts can be made with the same speed and accuracy as a single cut. The assured accuracy is said to be within 0.001 inch.

In operation, as the tool is moved forward to the workpiece, an incline plane and gear sector come into play and the cutter gradually extends beyond the diameter of the pilot to cut the required groove or grooves smoothly and quickly. The amount of movement of the cutter can be easily adjusted by means of a collar. Recesses can be spaced from either top or bottom surfaces of the work.

Additional features of the Maxwell Ratio Recessing Tool include a coolant hole which permits the flow of coolant or lubricant to the cutter, and a replaceable pilot which permits rotation of either the tool or workpiece, depending upon the application. Cutters are made to meet individual specifications and can be provided with carbide tips.

Gairing "E-Con-O-Mill"

The Gairing Tool Co., P. O. Box 478, Roosevelt Park Annex, Detroit 32, Mich., announces the development of a carbide face mill in standard sizes of 5-inch diameter and over, to be known as the "E-Con-O-Mill." The same blades and locks are said to fit all sizes of cutter bodies, thus simplifying tool inventory.



A BETTER BORING BAR

OUR fine list of Customers is PROOF that our method of broaching square holes makes a better fit for the tool bit. This means more rigidity and longer life especially with tungsten Carbide. We also make bars for our Type B and Type C cutters or a combination of tool bits and cutters. Bars are made to suit customers' requirements as to method of drive, pilot, number of holes, angle of bit, etc. Our two-bladed cutters can be floated in the bar or held rigidly. Cutters are interchangeable—hence can be ground in an arbor in the tool room and only require a few seconds for inserting in the bar.

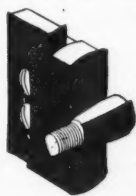
Square hole sizes range from $\frac{1}{4}$ " up to and including $\frac{3}{4}$ ".

THE DETROIT BORING BAR CO.
688 E. FORT ST. Detroit 26, Mich.

Established  1927

TYPE "B" AND "C" CUTTERS

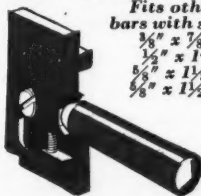
Suitable for Tipping With Tungsten Carbide



"B" A strong rigid serrated 2-bladed cutter—located in the bar with a taper pin. Bore holes accurately to close limits. Can be expanded and reground giving long life. Sizes $\frac{3}{8}$ " dia. up to 6".



"C" A simple 2-bladed reaming cutter. Can be expanded and reground. Located in the bar by a hardened V. This V never has to be reground as blades are expanded.



Fits other bars with slots
 $\frac{3}{8}$ " x $\frac{1}{8}$ "
 $\frac{1}{2}$ " x $\frac{1}{8}$ "
 $\frac{5}{8}$ " x $\frac{1}{8}$ "
 $\frac{3}{4}$ " x $\frac{1}{8}$ "



The cone type body of the E-Con-O-Mill is designed to provide full-height support to the blades and to afford maximum unobstructed chip clearance. The slots are cut to such tolerances as to permit replacing individual blades without regrinding the entire cutter, thereby reducing down time on machines. Blades of the square tool-bit type are furnished, with all clearance angles ground to a gage, ready for work. They may be individually resharpened on a wet carbide grinder. The blades are made in three types, with different radial rakes for steel, cast iron, and non-ferrous materials.

The locks are assembled in one piece and remain attached to the cutter body when changing blades. A positive locking

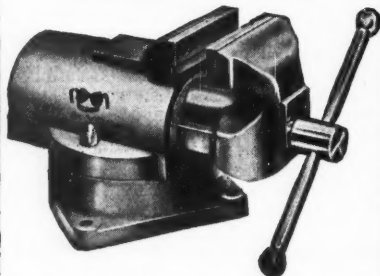


Gairing "E-Con-O-Mill"

wedge and compound angle on each blade are said to provide for true one-piece rigidity.

TOOL ROOM VISES

Immediate Delivery



Long guides for jaws provide strong grip. Easy swivel. Jaws: $3\frac{1}{2}$ ", $4\frac{1}{4}$ ", 5" open to 5", 6", 8".

A few choice territories open for representatives.

Write for further information.

VEIT & YOUNG

Established 1926
HUNTINGDON VALLEY, PA.

Taft-Peirce Machine Table Protractor

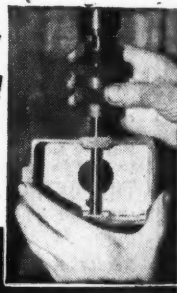
A quick and accurate method of obtaining an angular locating or working surface on milling machine or other machine tables is said to be provided by means of a machine table protractor now being manufactured by the Taft-Peirce Mfg. Co., Woonsocket, R. I. The graduated in-

How to remove burrs - FASTER, EASIER, BETTER!

With the new NOBUR tool you can burr holes faster—improve the finish of deburred parts and lower production costs by eliminating burring as a bench operation. The NOBUR tool works like a drill, making burring a fast, easy machine operation. The NOBUR tool is available in $1/16$ " progressive sizes from $3/16$ " to 1" in diameter. Write today for new complete burring folder.

NOBUR MANUFACTURING COMPANY

910 North Orange Drive, Los Angeles 38, California



The New "UTILITY"



MARKING OUTFIT

Nine sizes of type stamped with the same holder—furnished in sturdy wooden box—for all interchangeable marking.

Write for literature.



158 E. Carson St., Pittsburgh, Pa.

Small Precision Pins

**DOWEL - STRAIGHT
COUNTERSUNK - TAPER**

Made to Blueprint

**Centerless Ground
to $\pm .0001$ " Accuracy**

.030" to .125" Diam.

.125" to 2" Length

**Complete Centerless Service
Since 1931**

**COMMERCIAL
CENTERLESS
GRINDING CO.**

5605 Cedar Ave., Phone: EN 3412, CLEVELAND 3, O.

famco machines

**COST
CUTTING**

ARBOR PRESSES

Famco arbor presses are available in 32 stock models for floor or bench mounting... feature exclusive adjustable gib for front and side ram adjustment. Average less than 2c a year per press for maintenance cost!



FOOT PRESSES

Savings multiply on light punching and forming jobs with the use of any one of the 10 Famco foot press models. They may be bench or floor mounted.



PUNCH PRESSES

Newest of the Famco family, these power operated, open-back, inclinable punch presses are available in bench or floor models. Have semi-steel cast iron frames; solid, forged, precision-ground crank-shafts. With or without motor.



SQUARING SHEARS

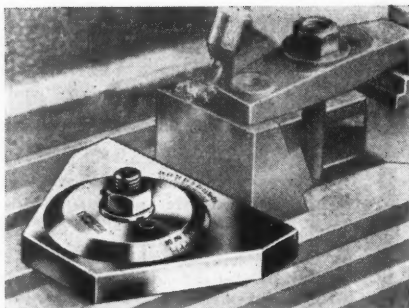
Famco foot-operated shears do precision shearing of up to 18 gauge mild steel. Come in 5 cutting widths (22" to 52")... have easy-to-set gauges.



Famco Machines save in first cost, operating cost and maintenance cost. Write today for full details about the complete line... there is no obligation.

FAMCO MACHINE CO.

1324 RACINE STREET • RACINE, WISCONSIN



Taft-Peirce Machine Table Protractor

dex plate of the unit includes a vernier scale which enables settings within 5 minutes of an angle to be obtained.

The Taft-Peirce Machine Table Protractor is constructed of hardened and precision-ground steel parts and is designed to accommodate standard size tongues to fit conventional T-slots. The protractor is available on order to meet special slot requirements.

Metron Electric Hand Tachometer

The Metron Instrument Co., 432 Lincoln St., Denver 9, Colo., announces the availability of a multiple range electric tachometer as a hand instrument for general purpose speed measurements in either revolutions per minute or feet per minute. With an accuracy of 1 per cent, three separate ranges are said to be provided on a 100 division $\frac{3}{8}$ -inch scale.

The Metron Electric Hand Tachometer is available in two types designated as the 25A and 25B. The Type 25A has ranges of 200 to 2,000, 500 to 5,000, and 1,000 to 10,000 r.p.m. The Type 25B is intended for low speeds and has ranges of 20 to 200, 50 to 500, and 100 to 1,000 r.p.m. The desired range is selected by means of a simple switch, and the instrument is claimed to be foolproof so that no damage results from the selection of an improper range, changing ranges while in operation, or from overspeeding.

The tachometer head, which has an operating torque of approximately 1/20 ounce-inch, is connected to the indicator by an electric cable so that no vibration from the rotating part reaches the indicator and readings are steady. The spindle on the head is the only rotating part

Adjustable MULTI-DRILL for Production Drilling

9" DRILLING AREA
AVAILABLE WITH 2 TO 8 SPINDLES

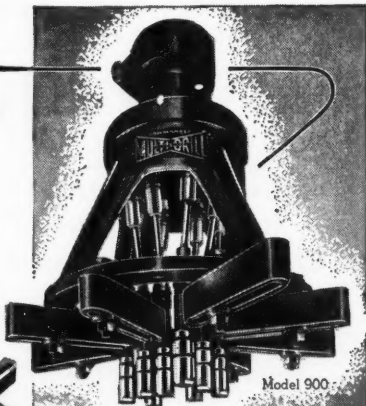
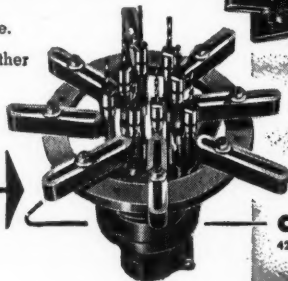
- Designed for accurate, high speed production drilling
- RUGGED CONSTRUCTION
- Quick, easy adjustments to any hole pattern on or within a 9" circle; $\frac{1}{2}$ " minimum center distances; Drill sizes $\frac{1}{16}$ " to $\frac{3}{8}$ "
- Special adaptations available.

MULTI-DRILLS are made in other sizes and models.

Write for details and name of your nearest Distributor.

Locator arms are designed for fast, easy adjustment

Dependable Performance...
proven by industry

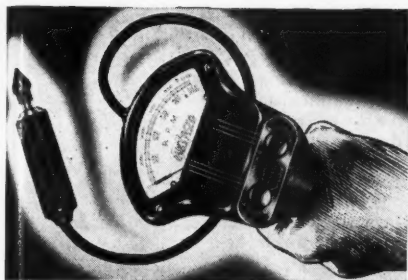


Model 900

**FITS ANY
DRILL PRESS**

COMMANDER MFG. CO.
4224 W. KINZIE STREET, CHICAGO 24, ILLINOIS

eter
Lin-
s the
etric
t for
t per
cent,
pro-
e.
eter
d as
has
and
B is
anges
1,000
d by
stru-
that
on of
while
s an
1/20
ator
ation
indi-
spin-
part



Metron Electric Hand Tachometer

and is mounted on permanently lubricated ball bearings for long life.

The Metron Electric Hand Tachometer is supplied in an attractive carrying case which also contains two 60-deg. cone tips, a hollow cone tip, a tip extension, and 1-foot and 1/10-foot circumference discs for measuring linear speeds in f.p.m. Speed adapters are available for extending the measuring speed ranges of the tachometer up or down by a factor of 10 to 1. The Type 25A with a high speed

adapter can be used to measure speeds as high as 100,000 r.p.m., and the Type 25B with a low speed adapter is designed to measure speeds as low as 2 r.p.m. The adapter in each case can be readily slipped over the head of the tachometer and actual speeds are obtained by merely adding or subtracting a zero from the indicating reading. Angle adapters are also available for measuring speeds in cramped quarters where the clearance at the end of the rotating shaft is as small as 2 inches.

Cresol Z-2 and Z-2A Cutting Oil Additives

Identified as Cresol Z-2 and Z-2A, two cutting oil additives which are designed to assist in the production of cutting oil coolants, drawing compounds, metal rolling, forming and extreme pressure lubricants are announced by Lubricants Inc., Fisher Bldg., Detroit 2, Mich. The additives are said to be particularly adapted to the machining of S & C steels, Monel metal, chrome, chrome molybdenum, chrome nickel, tungsten, and stainless steels.

**FOR DAY
AFTER DAY PRODUCTION**

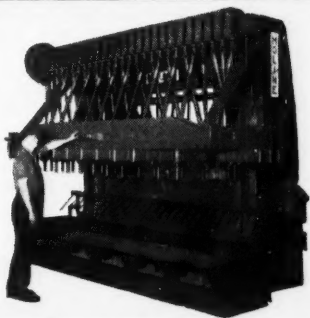
- ★ At greater Man-Hour **SAVINGS**
- ★ At higher rated **EFFICIENCY**
- ★ At finer, effortless **PRECISION**

A Moline Multiple Spindle Specially Designed Machine Tool can do your job better at less cost. Ruggedly built to fit your **INDIVIDUAL** requirements in such operations as Boring—Straight Line Drilling—Universal Adjustable Spindle Drilling—Honing—Tapping—Reaming—Counterboring—Special Milling—these machines are based on years of experience accumulated since 1901.

For your **SPECIAL** problem go "Hole-Hog" and write us for any information you may need.



No. HU68 DRILLER



MOLINE TOOL COMPANY
100 20th Street Moline, Illinois

Cresol Z-2 and Z-2A Cutting Oil Additives are modified sulphur chlorides and contain as high as 40 per cent sulphur and 30 per cent chlorine. When added to light mineral oils in percentages from 1 to 4 per cent, they make possible the economical production of cutting oils of unusual metal cutting ability, it is stated. Due to their chemical composition, the products, it is claimed, are very stable, do not stain ferrous metals, and do not gum or decompose when used as suggested. They are non-vesicants and will not cause skin infection, according to the manufacturer.



AUTOMATIC OILERS

SAVE
TIME—OIL—WORRY

Eliminate hand oiling . .
Stop bearing failures . .
Get maximum machine
life . . Easily installed.
Get all the facts:
WRITE FOR CATALOG.

TRICO FUSE MFG. CO.
Milwaukee Wisconsin

STANDARD STEEL SPECIALTIES

MACHINE KEYS

We can supply a complete line of finished machine keys including gib head and taper keys, rod keys, round end keys, etc.

WOODRUFF KEYS

Complete stock of standard keys on hand for prompt shipment. Made from open hearth or alloy steel.

TAPER PINS

Available in sizes 7/8 through 10 and lengths from 1/4 inch to 6 inches. Others made to specification.

MACHINE RACK

Can furnish rack from almost any size blank and pitch as well as length to form continuous sections.

Write for catalog

STANDARD STEEL SPECIALTY COMPANY

BEAVER FALLS

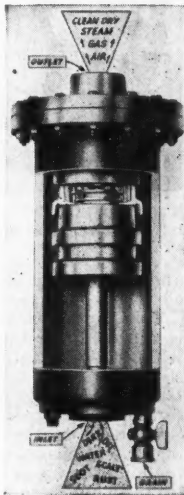
PENNSYLVANIA

PLANT, BEAVER FALLS, PA. • HAMMOND, IND.

CMD Model "E" Air Separator

The Chicago Manufacturing & Distributing Co., 1928 W. 46th St., Chicago 9, Ill., announces an air separator for delivering clean, dry steam, gas, and air. Designated as the CMD Model "E," the separator is strictly mechanical in operation and is said to require no attention whatsoever other than draining off condensation that accumulates in the chamber.

Made of non-corrosive metals throughout, the CMD Model E Air-Separator has a maximum rated capacity of 250 c.f.m., is 8 inches in diameter x 15 inches high, and has a 1 1/2-inch standard pipe connection. Three other models of air separators are also available.



**CMD Model "E"
Air Separator**

Michigan Shear-Speed Shaper

For producing other shapes than gears, the Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich., announces the availability of a shaper designated as the Shear-Speed. Among the various types of parts which can be cut from one setup on the machine are cams of various types, including over-running clutches; splines (both straight side and involute); toothed clutches; ratchet wheels; sprockets; and

SOUTH BEND

Quality Lathe Dogs

Made of heavy malleable iron for maximum strength and long service. Standard Lathe Dog has square head set screw. Safety Lathe Dog has headless set screw.

Prices shown apply to either style.

| Capacity | Price** | Capacity | Price** |
|----------|---------|-------------------------------|---------|
| 1/2" | \$0.80 | 3/8" | \$0.70 |
| 3/4" | .95 | 1/2" | .75 |
| 1" | 1.05 | 3/4" | .90 |
| 1-1/4" | 1.20 | 1" | 1.00 |
| 1-1/2" | 1.40 | 1-1/4" | 1.10 |
| 1-3/4" | 1.55 | 1-1/2" | 1.35 |
| 2" | 1.70 | | |
| 2-1/2" | 1.95 | * 13-inch or larger lathes. | |
| 3" | 2.20 | ** 9-inch and 10-inch lathes. | |
| 3-1/2" | 3.00 | | |
| 4" | 4.00 | | |



SOUTH BEND LATHE WORKS

427 E. Madison St.
South Bend 22, Ind.

ALLIGATOR



FILES

Over 4,000 shapes,
cuts and sizes of both
Swiss and American
patterns.

Get all your files
from one source.

Write for new catalog.

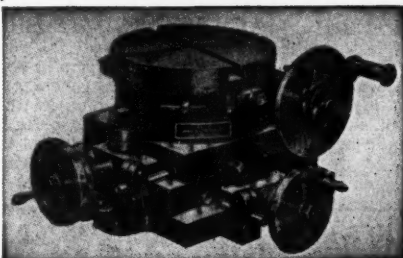
Garson - Newton Co.

61-71 MILL ST.
BELLEVILLE, NEW JERSEY



No. 1 COMPOUND TABLE

With 7 1/2" Dial Type Rotary
Table Mounted



We also make a No. 2 Size for 12"
Rotary Table. Can be had without
Rotary Table.

Write for Bulletin.
Rotary Tables • Multiple Spindle Index
Centers • Vises • Screw Machines •
Screw Head Slotters.

John B. Stevens Inc.

482 Canal St. New York 13, N. Y.

Top Rim STEEL STACKING BOXES

18" x 12" x 6". 16 Ga.
with Drop Handles

STANDARD SIZES

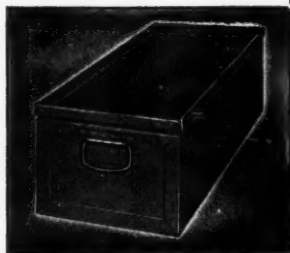
16 x 10 x 6 18 Ga.

16 x 10 x 6 16 Ga.

18 x 12 x 6 16 Ga.

18 x 12 x 8 16 Ga.

MADE IN OTHER SIZES



WE MANUFACTURE ALL TYPES OF STEEL BOXES

We make a specialty of boxes made to fit your particular handling requirements. Special boxes designed so they can be run thru with standards enable us to quote prices comparable with that of a standard box.

STERLING
FACTORY EQUIPMENT CO.

183 CHARLES ST.
PROVIDENCE, R. I.

many types of miscellaneous special external forms.

External shapes are cut by formed tools which are arranged to feed in radially from all sides during the cut. The work is reciprocated on the machine while the tools are fed in to the correct depth. The tools are automatically retracted to provide for relief on the return strokes.

An outstanding advantage claimed for the machine is that the feed is automatically adjusted during the cutting cycle to approximately balance the cutting load on each stroke. Thus, a fairly coarse feed is used during the first strokes while the

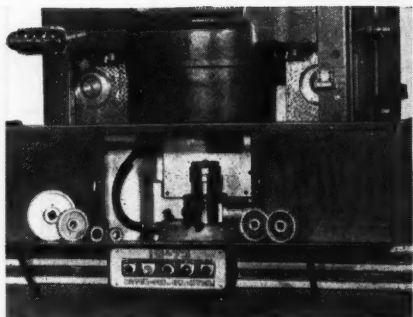


Illustration showing close-up view of Michigan Shear-Speed Shaper, together with parts for stokers which have been produced on the machine with interchangeable cutter assemblies

Why THOR STAMPS Last Longer



... because they're made of a special, correctly-heated alloy steel. Central striking point assures uniform marking. Thumb side marking assures easy use.

You get more mark per dollar with THOR STAMPS. Write for catalog and prices.

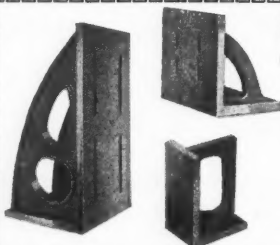
The Pittsburgh Stamp Co., Inc.
812 CANAL ST. • PITTSBURGH, PA.

tools are entering the cut, while the feed becomes finer as more and more of the cutting edges of the tools are being employed. This arrangement results in a fine feed for the finishing strokes, thereby ensuring a high degree of finish for the part.

Parts up to 10 inches in diameter x $2\frac{1}{4}$ inches in face width can be handled on the Michigan Shear-Speed Shaper. For narrower faced parts, several may be cut simultaneously as long as the total face width limitation is not exceeded. The complete cutting cycle time normally ranges from 13 to 50 seconds per piece, depending on the amount of stock to be removed.

Lyon-Raymond 3,000-Lb. Capacity High Lift Truck

A 3,000-lb. capacity high lift truck with four-wheel suspension, auto steer, and towing eye has been added to the line of hydraulic lift trucks offered by the Lyon-



SPECIAL MILWAUKEE ANGLES

Manufactured by the makers of Milwaukee Surface Plates, these precision tools combine the same high-quality workmanship and the utmost durability. Sizes from 4" x 4" x 4" to 18" x 18" x 36".

Write for your catalog today.

J. C. BUSCH COMPANY

Engineers and Machinists Since 1907

126 E. Pittsburgh Ave., Milwaukee 4, Wisconsin

**BAY
STATE[®]**

BAYFLEX[®]

Time saver—

money maker—

easier—

faster!—

—write them today!



Foundry and metal-fabricating shop operators are overwhelmed with their increased piece work production from BAYFLEX RAISED HUB DISC WHEELS.

Yes, where heavy duty portable grinders and sanders are used the jobs can now be done much faster—easier—cleaner. No wonder that BAYFLEX is so popular with management and operators alike!

The merits of this new product are many . . . the production possibilities unlimited. To appreciate the full value of BAYFLEX however, you must see it in operation. Ask for a demonstration at your plant. No obligation.

Branch offices and warehouses—
Chicago — Detroit
Distributors — All Principal cities

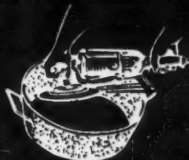
Top Performance Consistently
BAY STATE ABRASIVE PRODUCTS CO.



Unexcelled for cleaning castings.



For welds on angle-iron frames.



For hard-to-get-at places.



Has no equal for smoothing welds.



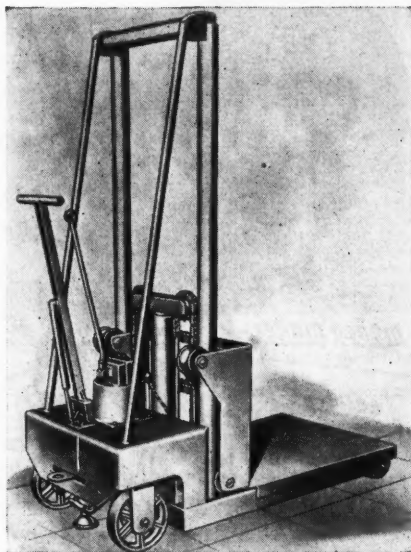
Hundreds of uses in auto repair shops.



A "MUST" for metal-fabricating shops.

Raymond Corp., 4208 Madison St., Greene, N. Y. The unit is described as a mobile easily-operated truck that is designed to (1) lift, elevate, and transport capacity loads, (2) support heavy overhanging work, (3) serve as a feeding table for difficult, heavy work feeding, (4) simplify and ease the handling and positioning of dies and other tools and fixtures, and (5) facilitate the tiering of skid loads and stacking of a wide range of materials and containers.

The fork type tubular frame of the truck is said to combine structural strength with lightweight. It provides a



Lyon-Raymond 3,000-Lb. Capacity High Lift Truck



WIRE ROPE CUTTER No. C

Hand Operated.

Price: \$93.84. Weight 110 lbs. Lever Action.

Made in two capacities: One for 1" and smaller wire rope. One for 1 1/4" and smaller wire rope.

Send for Circular

T. H. LEWTHWAITE MACHINE CO
317 East 47th St. New York 17

HIGH QUALITY LOW COST in Machine Bases

After 65 years, we really know how! Lighter, stronger bases; entirely accurate; any size; no cost of molds or castings. Let us fabricate your bases.



LITTLEFORD

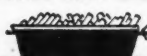
LITTLEFORD BROS., INC.
433 E. Pearl St., Cincinnati 2, O.

30 x 36-inch load platform, which is supported by concave rollers fitted to the tubular uprights. A floor lock brake is included as standard equipment. Power is furnished by a two-speed hydraulic hand pump which is mounted on the truck frame for convenient operation. A motorized hydraulic pump, operated by a 3/4 h.p. motor, can be furnished as optional equipment. Other extras include a die separator and winch.

The platform of the truck has a range of elevation from 6-inch lowered height to 54-inch elevated height. The overall height of the uprights is 83 inches. The

New Nesting Type TOTE PANS

20" Long x 12"
Wide x 6 1/4" Deep
16 Ga., drag holes,
handles both ends.



J. L. LUCAS & SON, INC.
BRIDGEPORT 5, CONN.



**PRECISION • ACCURACY
MACHINE KEYS**

ALL TYPES



Woodruff Keys • Machine Rack
Taper Pins • Straight Pins
Cotter Pins and Other
"Stanho" Steel Products.

**STANDARD
HORSE NAIL CORP.**

NEW BRIGHTON Since 1872 PENNA.

**MARVECO
LIVE CENTERS**

- HIGH SPEED
- LONG LIFE
- HEAVY DUTY



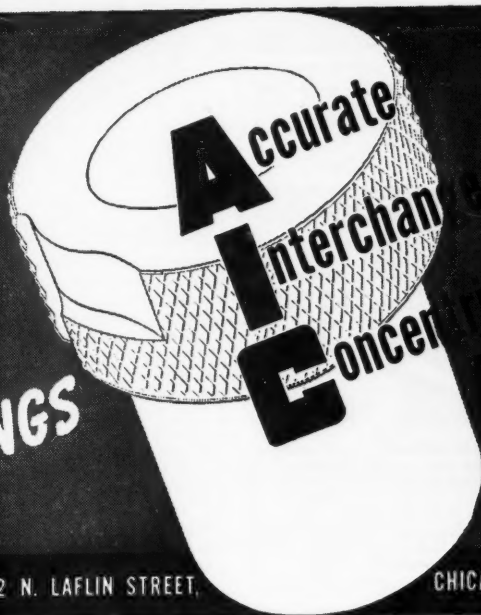
MARVECO - guaranteed to outperform and outlast any other live center. Write for free catalog, "The Marvels of Marveco."

**SEND US
YOUR CENTER PROBLEMS**

MARVEL TOOL & MACHINE CO.
3401 E. McNichols Road, Detroit 12, Mich.

WRITE
FOR
FREE
CATALOG

**DRILL
JIG
BUSHINGS**



212 N. LAFLIN STREET,

CHICAGO 7, ILLINOIS

Put the
**"POCKET-SIZE
 MACHINE SHOP"**
to Work!

**MOTO-TOOL
 No. 2 WITH
 EMERY POINT**

\$16.50

DREMEL'S Improved Moto-Tool . . . the little electric grinder that does big jobs . . . can save you hours, by speeding up work now being done by hand. Invaluable for sharpening taps, drills, gauges, chisels, tools and cutters (without tearing down "set-ups"). Dremel Moto-Tool is a "war veteran" . . . used by all branches of the Armed Forces in far-flung repair bases . . . helped to set production records at General Electric, Westinghouse, Remington Arms, Ford, Nash-Kelvinator, Northrup, Douglas and other plants.

**Approx.
 27,000
 R.P.M.**

LOOK FOR THESE MOTO - TOOL FEATURES

- Housing has "pencil-type" finger tip • Instant-action, wrenchless chuck • Oil-less, sealed trouble-proof bearings • Patented automatic chuck lock pin • Oversize armature shaft, hardened, ground and polished • 110 volt, universal type (AC-DC) motor • Easily replaced commutator brushes • About 27,000 R.P.M.; cuts cleaner . . . saves cutters • Sliding snap-type switch • Handy hanger hook • Cord protector • Sturdy, shockproof bakelite housing • Dust-filtered air-cooling system • Weighs only 13 oz. . . . shaped to fit the hand • Dynamically balanced for vibrationless operation.

MOTO-TOOL KIT No. 2



**With 23
 Accessories
 \$23.50**

**PRE-WAR
 PRICES
 STILL
 PREVAIL**

Moto-Tool Kit No. 2, with 23 accessories (high speed steel cutters, grinding wheels, polishing accessories) and heavy-duty professional Model 2 Moto-tool in natural finish, hardwood case—\$23.50. (Items purchased separately would cost about \$30.00; you save \$6.50). Moto-Tool No. 2, with one emery point, \$16.50.

**SEE YOUR MILL SUPPLY DEALER. IF HE DOES NOT
 HANDLE MOTO-TOOL, WRITE THE FACTORY.**

DREMEL MANUFACTURING CO.

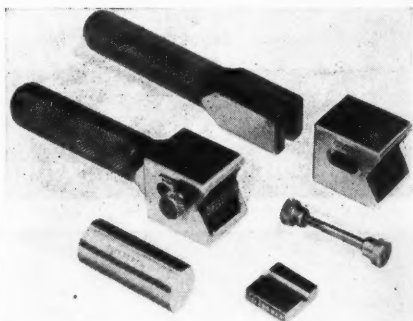
DEPT. T-228-A

RACINE, WIS.

truck is equipped with two 10-inch diameter x 2-inch face semi-steel front wheels and two 5-inch diameter x 3-inch face semi-steel rear wheels, all wheels being equipped with Timken roller bearings. The elevating rolls and sprockets are furnished with needle bearings. Welded formed steel plates provide the truck with a streamlined appearance and are said to assure maximum strength in all parts.

**New Method Floating V-Guide
 Hand Stamp**

A semi-universal self-centering and self-aligning hand stamp for use in marking various sizes of solid round bar stock with part numbers, serial numbers, heat



New Method Floating V-Guide Hand Stamp

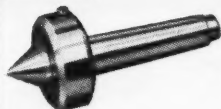
treat data, and so on, has been added to the line of marking tools offered by New Method Steel Stamps, Inc., 149 Jos. Campau St., Detroit 7, Mich. The tool consists of a holder, V-block guide, clamping pin, and either individual type or a logotype engraved with the required lettering, and so on. The V-guide slips over the holder and marking die. Assembly of the tool is completed with the insertion of the clamping pin through the guide slots of the V-guide and the groove in the logotype. The V-guide slides up and down, thereby automatically centering and aligning the stamp on bars of various diameters during use.

The New Method Floating V-Guide Hand Stamp is of a "semi-standard" design since V-guides of various sizes and marking dies containing a wide range of information can be readily produced to

SOUTH BEND

New Ball Bearing Live Center

Designed for maximum strength and rigidity, the *Ball Bearing Live Center* is recommended for high speeds, heavy roughing cuts, etc. 60 degree point runs in substantial precision ball bearing which is easily replaceable.



Patent Pending

Center with No. 2 taper shank — **\$11.50**
With No. 3 shank — **\$13.50**

SOUTH BEND LATHE WORKS 427 E. Madison St. South Bend 22, Ind.



CUTTERS

All standard sizes carried in stock for immediate delivery. Special cutters made to Blue Print.

CUTTER SPECIALISTS SINCE 1919.

Write today for prices. A few territories open.

QUALITY TOOL WORKS
WAUKEGAN ILLINOIS

GAMMONS REAMERS



Manufacturers of

The Gammons Helical Taper Pin Reamer
The Gammons Helical Chucking Reamer
The Gammons Helical Die Making Reamer
The Gammons Double Taper Pin Reamer
Special reaming problems invited
Send for Catalog

THE GAMMONS-HOAGLUND CO.
MANCHESTER CONNECTICUT

Mac-it ALLOY STEEL SCREWS



GET POSITIVE LOCKING ACTION with MAC-IT HOLLOW LOCK SCREWS!

Mac-it Hollow Lock Screws provide a locking arrangement that combines convenience with positive locking action. They lock as effectively after many thousand adjustments as they do the first time. All Mac-it screws are heat-treated and accurately made with die-cut threads. Whatever your needs, let the complete Mac-it line serve you. Sold through recognized distributors from coast to coast and in Canada.

DISTRIBUTED NATIONALLY BY

STRONG, CARLISLE & HAMMOND COMPANY

CLEVELAND 13, OHIO

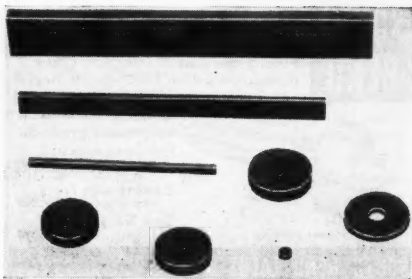
MANUFACTURED BY

MAC-IT PARTS COMPANY LANCASTER, PA.

suit individual requirements. The tool is of hardened steel throughout, with each piece accurately ground to size. The handle is knurled to allow for firm gripping of the tool and is tempered for long service under severe conditions.

Carboloy Cemented Carbide Discs and Strips

Three additional cemented carbide products—solid discs, discs with holes, and solid strips—are now available as stan-



Carboloy Cemented Carbide Discs and Strips

BAUMBACH

THE DIE SET
AUTHORITY



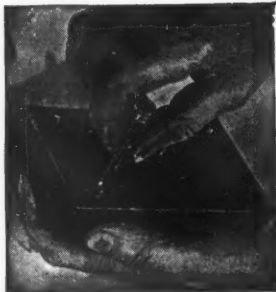
All Baumbach Die-Sets have demountable Leader Pins and Bushings. This exclusive feature permits removing Leader pins for machine work on the die shoe and assures reassembly without loss of alignment. A big time and trouble saver. Write for Catalog.

E. A. BAUMBACH MFG. CO.
1806 S. KILBOURN AVE. CHICAGO 23, ILL.

dard stock items from the Carboloy Co., Inc., 11149 E. Eight Mile Blvd., Detroit 32, Mich. The solid discs are furnished in ten sizes ranging from $\frac{1}{8}$ inch in diameter x $\frac{1}{16}$ inch thick up to 1 inch in diameter x $\frac{1}{8}$ inch thick, and are intended for use as wearproof inserts in gages of various types, as well as micrometers and comparators; for toolmakers' flats; and for the weatherproofing of tools and equipment in general.

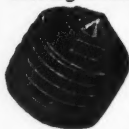
The discs with holes are available in 12 sizes ranging from $\frac{1}{8}$ inch O.D. x $\frac{1}{8}$ inch I.D. x 0.030 inch thick up to $1\frac{1}{4}$ inches O.D. x $\frac{1}{8}$ inch I.D. x 0.060 inch thick. They are particularly recommended for use in the making of small solid carbide slitting saws, and can also be used as nozzle inserts for various types of sprayers; as small orifices where undue wear is encountered, and so on.

The solid carbide strips are available in 21 sizes ranging from $\frac{1}{8}$ x $\frac{1}{8}$ x 3 inches up to $\frac{1}{2}$ x $\frac{3}{4}$ x 6 inches and are particularly applicable as hard, wearproof facings on the working surfaces of centerless grinder work rests. Attached to stone cutting tools, they are said to prolong the service life of such tools.



A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in $\frac{1}{8}$ " to 1" diameters. Send for price list.

HEIMANN MFG. CO.

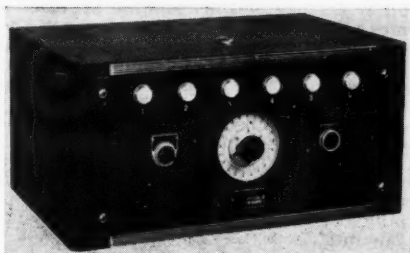
330 Lincoln Ave.

Urbana, Ohio

"Surface" Atmosphere Selector

The Surface Combustion Corp., Toledo 1, Ohio, has announced the availability of a selector for atmosphere gases which is said to greatly increase the effectiveness of the "Surface" dew point recorder by enabling it to analyze consecutively atmospheres from as many as six different sources (generators, furnaces, and so on) in timed sequence. The atmosphere selector consists primarily of a six-way valve for six incoming atmosphere sources, motor, and electric time clock so arranged that at a preset time the source of atmosphere supply to the Dew Point Recorder is automatically switched from one line to the next. In the meantime, the five remaining lines which are not feeding the recorder are continuously purged so that when the next source is to be analyzed no time is lost in purging. The source from which the atmosphere is being analyzed is indicated by numbered (1 to 6) pilot lamps on the control panel of the machine.

In addition to the indicating lamps, three additional controls are provided. A push button on the panel, when pressed, is arranged to manually transfer the inlet valve to the next station or source



"Surface" Atmosphere Selector

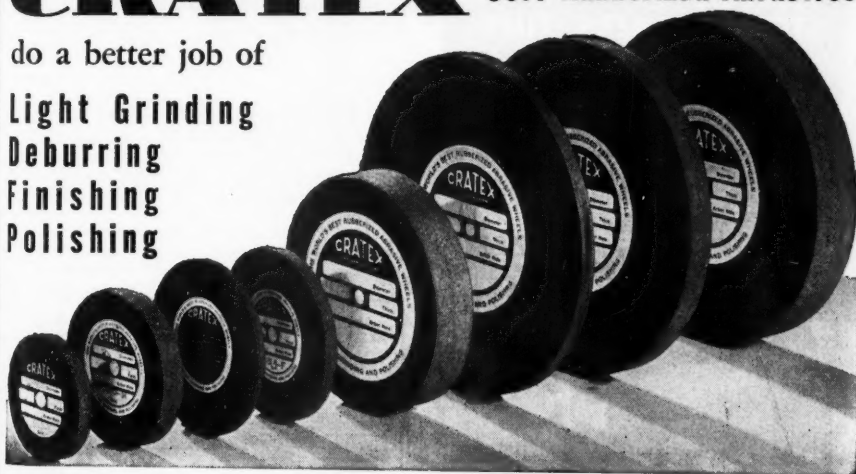
line. The frequency at which atmospheres may be analyzed for dew point is set by the large control dial in the center of the panel. An "on-off" switch is also included. A typical clock setting for the analyzing frequency is at 30-minute intervals so that six samples will be taken and recorded in a three-hour period, with reanalyzing of each line repeated at three-hour intervals.

Since all six lines may not be needed when the manifold is first installed, an-

CRATEX Soft Rubberized Abrasives

do a better job of

Light Grinding
Deburring
Finishing
Polishing



Industrials all over the United States use CRATEX soft rubberized abrasive Wheels, Blocks and Sticks. Requests for Catalog, samples or specific information will be answered immediately. At Tool and Supply Dealers.

CRATEX MANUFACTURING CO., 97 Natoma Street, San Francisco 5, Calif.

other feature of the machine provides a means for skipping one or more lines and returning the inlet valve to the initial line automatically. Thus, additional capacity is available for later use without impairing the speed and initial versatility of the unit. No provision is made to cause the valve to automatically skip one individual intermediate line, since all lines in use can readily be connected in consecutive order. The control switch for skipping the sampling lines is located inside the unit.

The "Surface" Atmosphere Selector is enclosed in a cabinet approximately 10½

inches high x 12 inches long x 13½ inches deep. A door on top of the cabinet provides for easy access to the interior.

Hanna Redesigned "Unitite" Valve

The Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill., has redesigned its "Unitite" Valve for air and hydraulic lines to incorporate a protective dust seal. The seal consists of a Neoprene skirt mounted on the valve stem underneath the handle to snugly shroud the boss on the bonnet, thus protecting the working parts from dust.



Hanna Redesigned "Unitite" Valve

A modification has also been made in the lubrication fitting of the valve. This fitting is mounted in the stem so that the valve disc and stem are pressure lubricated radially outward from the center. Lubrication is accomplished without taking the valve out of service or shutting off the flow. The body and bonnet of the valve have been redesigned to eliminate the annoyance of knuckle barking and to eliminate collecting places for dirt and grease.

**BREAKDOWNS A SPECIALTY
'ROUND THE CLOCK SERVICE**

Gears

Over 500 Machines to Serve You

ONE OR A MILLION

- SPUR • WORMS • RACKS • HELICAL
- BEVELS • SPLINE • SECTORS • SPROCKETS

metallic—non-metallic

¼ TO 72 INCHES IN DIAMETER Ask for our equipment list

A FEW SALES TERRITORIES AVAILABLE

MASTER MACHINE & GEAR WORKS, INC. OXFORD, MICHIGAN

**SAVES TOOL MAKERS' TIME
T R O Y K E
ROTARY TABLES**

7 SIZES
10 MODELS
9" to 25"

ATA Catalog on request
TROYKE MFG. CO.
4422 Appleton St., Cincinnati 9, Ohio

MP Adjustable Tooth Form

An adjustable tooth form providing a variable tooth thickness but still retaining a full profile bearing has been developed by the MP Tool & Engineering Co., Detroit, Mich. The tooth is described as having individual left-side and right-side profiles extending through the full width

ALL ALLOY PORTABLE SHEARS

FULLY GUARANTEED

Two Sizes

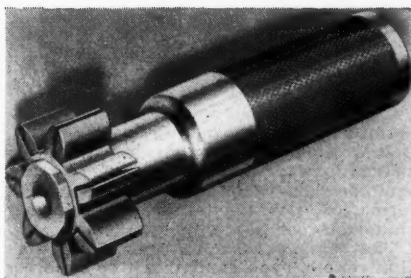
No. 1 cuts up to No. 11 gauge strip or sheet.
No. 2 cuts up to ¼" steel plate.

BREMIL MFG. CO.
1400 Pittsburgh Ave. Erie, Pa.

of the gear. These profiles are rolled into or away from each other to vary the tooth thickness or tooth space.

In checking operations, the MP Adjustable Tooth Form is said to increase accuracy and save time in solving difficult spline-locating problems involving diameter and face relations to internal splines. With the tool, the part is checked from the internal teeth only regardless of the tooth space broached or the wear in the locator, since a torsion spring holds the tooth profiles outward to a tooth thickness larger than any tooth space that is broached.

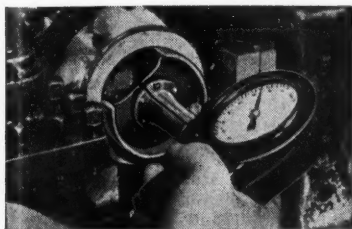
As a gaging device applied to internal and external spline and gear gages, the MP Adjustable Tooth Form in conjunction with dial indicators is said to offer a means for visually indicating external and internal teeth, with double-checking operations eliminated. When the MP gear ring gage is adapted to a hole grinder or diamond boring machine, a self-centering adjustable gear chuck results. The locking rotary motion is imparted through a drawbar, helical slot, and cam follower either mechanically, hydraulically, or pneumatically. In the MP gear chuck, once the gears are ground or lapped in



MP Adjustable Tooth Form

place, the self-centering adjustable teeth, which act as locators and grippers, are said to remain correctly set indefinitely but still allow considerable latitude in varying tooth thicknesses without rendering the chuck obsolete.

In spline mandrels, for between-centers turning, grinding, or checking, the MP principal is claimed to obviate the necessity of employing mandrels with tapered teeth or tapered diameters. One mandrel is required regardless of tooth tolerances.



Comtorplug in use on turret lathe.

Here's HOLE GAGING that matches the new machines in speed, accuracy

COMTORPLUG

used for bench inspection and AT or IN the machine.

Gages holes $\frac{1}{8}$ " to 8" dia. to fractions of .0001".

Modern machine tools have NOT outrun ALL shop gages! Although solid plugs are inadequate, the patented expanding, internal gage known as "Comtorplug" puts positive, precise gaging in the hands of your machine operators and bench inspectors. Made in sizes to gage holes from $\frac{1}{8}$ " to 8" dia. Shows exact size (not a passing reading), detects out-of-round, front or back taper, bell mouth, etc., to fractions of .0001". Automatic accuracy, free of human variations. Gages without removing work from chuck. In use at machines in hundreds of plants—"shop ruggedness with laboratory accuracy." Your new machines can produce the top accuracy of which they are capable, only if your operators have gaging precision comparable to the machine's precision. "Comtorplug" is the answer—see it and you'll see why.

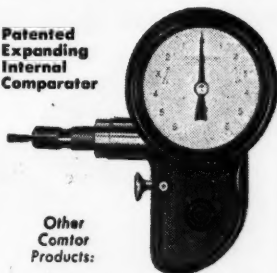
Request 8-page Bulletin No. 33

COMTOR CO.

64 RUMFORD AVENUE

WALTHAM, MASS.

Patented
Expanding
Internal
Comparator



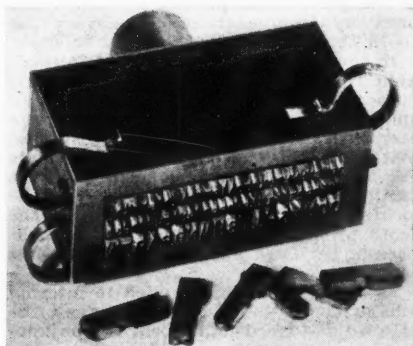
Other
Comtor
Products:

"COMTORGAGE," Precision External
Comparator: Bulletin 30
COMTOR SURFACE SMOOTHNESS
COMPARATOR: Bulletin 32A

New Method Multiple-Line Interchangeable Type Holder

A device for the multiple straight-line stamping of letters and figures in metal has been developed by New Method Steel Stamps, Inc., 149 Joseph Campau St., Detroit 7, Mich. With the marker, complete instructions for the use of tools and other equipment, as well as name plates and information of a like nature, can be machine stamped in a single operation.

The New Method Multiple-Line Interchangeable Type Holder can be used for many purposes since the lines of type are



New Method Multiple-Line Interchangeable Type Holder

interchangeable. The individual type—bearing numbers, symbols, special designs, and so on—is set into the holder in the same manner that type is set up in a print shop. Each individual piece of type is slotted so that the entire row of monotype and spacing slugs can be held in place with a flat locking pin. The retainer of the holder has a hardened steel anvil for the type to bottom against. The outer case of the retainer is of hardened and tempered tool steel to ensure long life even under severe service conditions. All insert monotypes are hardened and then ground to a standard size and length for accurate alignment when the type is assembled in the holder.

The New Method Multiple-Line Interchangeable Type Holder can be used either in the regulation mechanical marking machines or in a variety of punch presses. The design of the marker permits it to be furnished in a variety of sizes and type capacities to suit individual marking requirements.

FLYNN

OFFSET BORING HEADS


Micrometer offset screw ground from solid.

Large, easy to read dial graduated in .001"

Tool block hardened, ground and fitted to body.

"V" tool block holds any size bar rigid.

Interchangeable shanks and arbors.



USED FOR 30 YEARS IN TOOL ROOMS AND PRODUCTION SHOPS FOR PRECISION BORING

| Head No. | Body Dia. | Maximum Bar Capacity | Micro Offset | Price |
|----------|-----------|----------------------|--------------|--------|
| 6 | 1 7/8" | 3/4" | 1/4" | \$ 22. |
| 8 | 3 1/4" | 3/4" | 1/2" | 30. |
| 10 | 4" | 3/4" | 1/2" | 70. |
| 12 | 4" | 3/4" | 1" | 45. |
| 20 | 7 1/2" | 1 1/2" | 1" | 125. |
| 30 | 4" | 3/4" | 1 1/2" | 70. |
| 32 | 5 1/2" | 1" | 2" | 115. |
| 35 | 4 3/4" | 3/4" | 1 1/2" | 85. |
| 36 | 6 3/4" | 1 1/4" | 2" | 150. |

FLYNN MANUFACTURING CO.

117 HATES STREET • DETROIT 26, MICHIGAN



ANNIS Production Type

ELECTRIC ETCHER

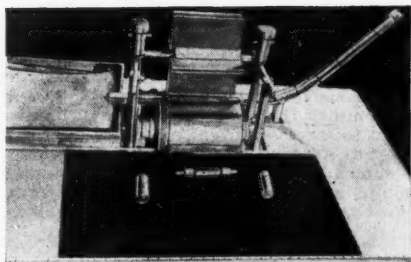
SPECIFICATIONS—Navy bronze contact plate; Aluminum alloy case 4" x 8" x 10"; Weight 22 pounds; Recessed, heavy duty heat selector switch and pilot light; Handy cord storage compartment; Special current regulating transformer gives smooth etching action with the offset, coolgrip stylus. For operation on regular 110-volt AC lighting circuits. Fully guaranteed. Price \$67.50. Immediate delivery.

R. B. ANNIS COMPANY

1107 N. Delaware St. Indianapolis 2, Ind.

Fel-Pro C-5 "Hi-Temp" Thread Compound

Designated as Fel-Pro C-5 "Hi-Temp," a thread compound that is said to prevent freezing and galling of metal surfaces at temperatures as high as 1,800 deg. F. is now being released by the Felt Products Manufacturing Co., Dept. P243, 1504 Carroll Ave., Chicago 7, Ill. Developed specifically for high temperature and high pressure applications, such as furnace tube header studs and plugs, the compound is claimed to be particularly useful by petroleum companies, chemical plants, railroads, and other companies where extreme operating temperatures and pressures are encountered.



View of Size Control Automatic Feed Attachment showing cylindrical pieces in feed chute at right, 4-vaned holding applicator holding pieces between lapping rolls in center, and pieces being ejected at left

Size Control Automatic Feed Attachment

To enable maximum economy, high production, and uniform results to be obtained in performing operations on its centerless lapping machine, the Size Control Co., Division of American Gage & Machine Co., 2500 Washington Blvd., Chicago, Ill., is now offering an attachment

whereby feeding, holding, and ejecting of the work are accomplished automatically; the operator, after adjusting the tension on the holding applicator, merely keeps the feed chute loaded with the pieces to be lapped.

With the attachment, cylindrical pieces are fed in between the lapping rolls of the machine where they are said to be

**PRICE TAGS
of QUALITY**

Adjustable

MULTIPLE DRILL HEADS
Fit any machine, 2 to 10 Spindles.
Save 2 to 10 Operations.

PRICES

| | |
|--------------------|----------|
| U-1 3 Spindle Head | \$150.00 |
| 4 " " | 155.00 |
| 5 " " | 160.00 |
| 6 " " | 170.00 |
| 7 " " | 180.00 |
| 8 " " | 200.00 |

6" DRILLING AREA
1/4 capacity
21/32 center



IMMEDIATE DELIVERY!
WRITE TODAY
For descriptive catalog.

PRICES

| | |
|--------------------|----------|
| U-2 3 Spindle Head | \$177.00 |
| 4 " " | 204.00 |
| 5 " " | 231.00 |
| 6 " " | 258.00 |
| 7 " " | 285.00 |
| 8 " " | 312.00 |
| 9 " " | 339.00 |
| 10 " " | 366.00 |

10" DRILLING AREA
1/4 capacity in cast iron standard
3/8 special adaption in cast iron



SINCE 1915

Also manufacturers of all types of fixed center heads

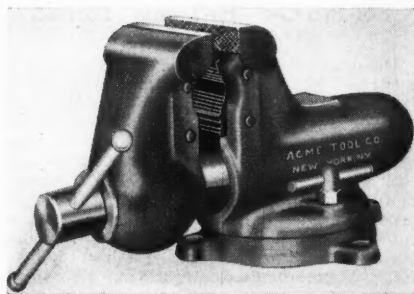
UNITED STATES DRILL HEAD CO.

CINCINNATI 4, OHIO

lapped to a precision finish of less than 2 micro-inches as they move to the left under the holding vane, and are ejected at the opposite end. Quickly adjustable spring tension on the holding applicator determines the pressure that will be applied to the cylindrical pieces as they are lapped. As one of the four holding vanes becomes gummed-up with lapping compound and other material, a clean vane can be quickly rotated into position.

Acme Precision-Built Combination Pipe and Bench Vise

A precision-built combination pipe and bench vise with swivel base is now being offered by the Acme Tool Co., 69 W. Broadway, New York 7, N. Y. The two main body parts are snugly fitted and machined to unusually close tolerances. The precision threaded steel spindle is said to move with ease in the horizontally centered clamping nut, yet is designed to provide for an unusually powerful clamping action when the vise is locked. The pipe jaws are individually milled so as to provide for firm gripping of the



Acme Precision-Built Combination Pipe and Bench Vise

work. The jaws, which are made of deep case hardened steel, are supported by strong hardened pins and are reversible and interchangeable.

The Acme Precision-Built Combination Pipe and Bench Vise is designed to hold pipes from $\frac{1}{8}$ to $3\frac{1}{2}$ inches in diameter and has a jaw width of $4\frac{1}{2}$ inches, throat depth of $4\frac{1}{2}$ inches, maximum usable opening of $5\frac{1}{2}$ inches, and shipping weight of 68 pounds.



4-Spindle,
Light-Duty Head
with Templates Removed.

TOOL-UP for PRODUCTION Drilling and Tapping with KWICK-CHANGE Multiple Drill Heads...

- New Adjustment Principle — permits accurate location of spindles for almost any bolt circle or irregular hole pattern.
- Set-Ups "Stay Put" — Positioning and locking templates for ease of set-up, positive location.
- Standard Models with 2 to 6 spindles in Light-, Medium- and Heavy-Duty Types.

Write for FREE Illustrated Bulletin

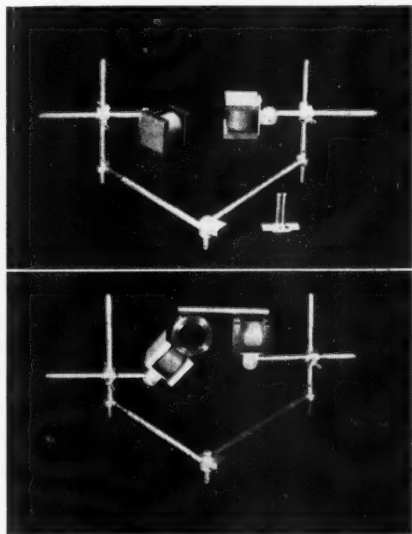
STRUTZ & MEAD, Inc.
DISTRIBUTORS FOR
WISCONSIN DRILL HEAD CO.

1227 N. Water Street, Milwaukee 2, Wisconsin

Lewis Magnetic Welding Positioner

A magnetic welding positioner for use in either gas or arc welding or soldering has been placed on the market by the Lewis Machine Co., Inc., 1160 E. 7th St., St. Paul 6, Minn. The unit is claimed to have sufficient magnetic strength to hold steel or cast iron pieces much larger than the positioner itself.

Using two 2 x 2 x 2 1/4-inch universally mounted Alnico magnets, the Lewis Magnetic Welding Positioner is said to rigidly hold two or more workpieces in practical-



Lewis Magnetic Welding Positioner

ly any conceivable position. Heat normally transferred to the magnets will not affect their magnetic strength, it is claimed. Non-magnetic materials can be held together in toolmaker's or C-clamps and the clamps, in turn, held by the magnets.

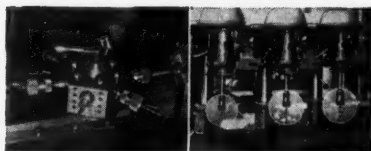
Haller Model D-600 Hydraulic Stock Feed

A hydraulically-operated stock feed for use on practically any punch press is announced by the Haller Machine & Mfg. Co., Inc., 7940 Tireman Ave., Detroit 4, Mich. Designated as the Model D-600, the

*Chewed-up
Drill Shanks
Eliminated.*

WITH
"KNOCK-OUT"
KEYLESS DRILL CHUCKS

Cut down your drill cost with this self-energizing chuck—the harder the drill works the tighter it grabs, eliminates slipping that ruins drill shanks. Sizes up to 7/8"—for drill press, lathe, portable drill.



Ask your nearest Mill Supply House or
Mail the coupon TODAY for Bulletin.

K. O. LEE CO. ABERDEEN, SO. DAKOTA

K. O. Lee Company
1216 First Ave. S. E., Aberdeen, So. Dak.

Please send us the illustrated bulletin describing "K-O" Keyless Drill Chucks.

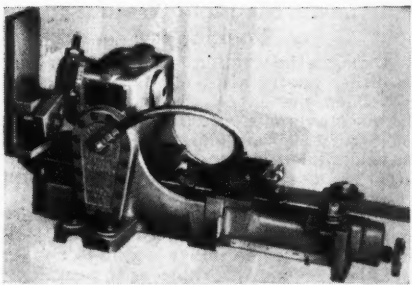
Name

Address

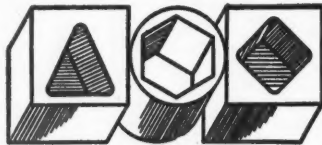
City State

unit is designed to handle all stock up to 4 inches wide and $\frac{3}{4}$ inch thick and to feed any desired length from 0 to 5 inches within 0.003 to 0.005 inch.

The Haller Model D-600 Hydraulic Stock Feed is compactly made and entirely self-contained. It is intended for mounting on the bolster plate of the press and can be located to feed from the left, right, front, or back. The feed can be driven directly from the press ram with any ram stroke up to 6 inches, and is said to have sufficient power to pull the stock through a roll-type straightener. Installation and adjustment of the unit are said



Haller Model D-600 Hydraulic Stock Feed



DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS
Wilmerding, Pa.

to be so easily effected that the feed can be readily removed from one press and used on another when desired. All operating parts of the unit function in oil.

The Haller Model D-600 Hydraulic Stock Feed measures 20 inches long x $10\frac{1}{2}$ inches wide x $10\frac{1}{4}$ inches high and has a net weight of 58 pounds.

Flynn Redesigned No. 12 Offset Boring Head

A complete redesign of its No. 12 offset boring head is announced by the Flynn Manufacturing Co., 437 Bates St., Detroit 26, Mich. The principal change consists of a more compact body which permits extension of the tool block nose beyond the body for closer access to the work on recessed and hard-to-reach jobs. Moreover, the wall of the tool grip has been increased $\frac{1}{8}$ inch on each side, the length of the tool grip has been increased $\frac{1}{2}$ inch, ground bearing surfaces have been increased at two points by as much as 60 per cent, and smoothness of operation and rigidity have been increased by reducing the space between the ways,

High Speed COUNTERBORES BACK SPOT FACERS



Interchangeable

Catalog
or
Request

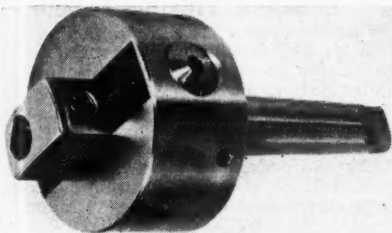
BICKNELL-THOMAS COMPANY
Greenfield Massachusetts

COMMISSION SALESMEN WANTED

To solicit gear business.
Exclusive Territory.
Good Commissions.



TAYLOR
MACHINE COMPANY
MANUFACTURERS OF
AVIATION & AUTOMOTIVE PARTS
Gear Specialists
1917 EAST 61ST ST. • CLEVELAND 3, OHIO



Flynn Redesigned No. 12 Offset Boring Head

thus centralizing the adjusting micrometer screw.

Other improvements in the Flynn No. 12 Offset Boring Head include the use of a more easily read dial on the micrometer adjusting screw and the introduction of a lock tension screw (Head No. 12-S), if desired, for relieving the strain on the hardened and ground micrometer screw in heavy work. Square hole adjusting screws have been replaced with standard hexagon screws, with one wrench fitting all adjustments. According to the manufacturer, the improvements involve no

change in the smooth, round, safety contour of the head, which also retains the V-type tool grip that provides for three-point contact on the tool.

Bijur Constant Feed Gear Pump

A compact constant feed gear pump with $2\frac{1}{2}$ -inch diameter base which enables it to be readily adapted to machines where space limitations exist has been developed by the Bijur Lubricating Corp., 43-01 Twenty-Second St., Long Island City 1, N. Y. The pump is a small capacity unit, providing 50 c.c. per minute at 100 r.p.m. As a result of this small delivery, the correct quantity required by the machine can be fed to it without by-passing a high percentage of the output, it is claimed.

A high efficiency unit, the Bijur Constant Feed Gear Pump is said to maintain a constant feed under high pressure during operation of the machine. The pump is manufactured in three types, as shown in the accompanying illustration. The universal type (upper right) can be mounted in any position, the direction of drive shaft rotation determining the

WHITNEY-JENSEN PRODUCTS

30 YEARS EXPERIENCE

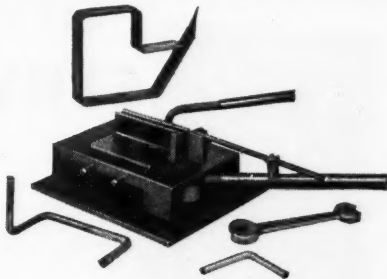
No. 52 BENDER

CAPACITY, MILD STEEL

$\frac{1}{2}$ " ROUND SOLID BAR

$\frac{1}{4}$ " x 2" FLAT BARS

$\frac{1}{4}$ " x 2" NOTCHED ANGLE IRON



Bender is easy to operate and ruggedly built. Patented adjustment automatically compensates for the thickness of metal.

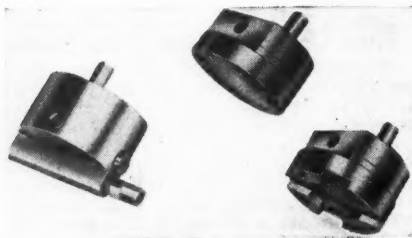
No. 50 ANGLE IRON MITRE NOTCHER

CAPACITY—ALL SIZES OF ANGLE IRON THRU 2" x 2" x $\frac{1}{4}$ "
WEIGHT—62 LBS.



WHITNEY METAL TOOL COMPANY
116 FORBES ST. • ROCKFORD, ILL.

direction of flow. The reversible type (left center) maintains flow in one direction only regardless of a change in the drive shaft rotation during operation. The



Bijur Constant Feed Gear Pumps

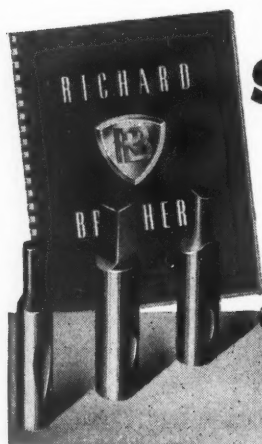
sump type (lower right) is equipped with an integral fine mesh screen and may be mounted directly in the sump. Any one of the three types may be used in conjunction with the Bijur system of metered lubrication which is designed to automatically provide the correct oil film for each individual bearing.

"Ronaflex" Flexible Tubing

Flexible tubing that is claimed to possess the high flexibility of rubber and the sturdiness of steel is now being offered under the name of "Ronaflex" by the Penflex Sales Co., 7200 Powers Lane, Philadelphia 42, Pa. According to the manufacturer, the tubing is designed to withstand pressures up to 980 p.s.i. without any indication of bursting, leakage, or damage, and can be bent, kinked, or twisted, yet provides for safe, free-flowing transmission of air, water, gases, oil, and volatiles.

The tubing consists of a tough rubber tubing protected by a strong steel wire braid cover to withstand abrasion, severe wear, and pressure. The rubber tubing is made of specially compounded synthetic rubber to resist the effects of oil and volatiles, while the braiding is constructed of either galvanized or stainless steel, aluminum, or bronze for specific conditions.

Ronaflex Flexible Tubing is available with high-speed snap-on couplings that can be connected and disconnected in one easy operation and are precision made of aluminum to resist rust, corrosion, and heavy wear. The tubing is claimed to be



GET THE WHOLE STORY OF SERVICE WITH A

Punch!

Allied's 48-page R-B catalog contains complete data and prices on R-B Interchangeable Punches and Dies—recognized and used for accurate, trouble-free punching throughout the metal-working and plastics industries. But that is only part of the R-B story. Also included in this catalog is

full information on Allied's "one stop service" which includes retainers, composite die sections, rubber strippers, guide pins and bushings, and miscellaneous die makers' supplies. A copy is available to you without charge or obligation. Write for it today.



ALLIED PRODUCTS CORPORATION

Department 23 • 4624 Lawton Ave. • Detroit 8, Michigan



The stage is set . . . and here's your cue!

Coming soon: The case of the elusive customer.

First, of course, you must find your buyers. You already have a good idea *who* they are . . . but have you been able to reach them with a *convincing* selling display of your company's products?

The American Society of Tool Engineers is providing the stage and the audience for this at the Tool Engineers' Industrial Exposition in Cleveland, Ohio, next March 15-19—to help you make your contacts.

Curtain call

ASTE's last Exposition drew thousands of top executives, industrial engineers and tool engineers . . . the very men who *dictate the purchase and can specify your product for their plants.*

New and different products and methods, technical sessions, plant tours, industrial movies, all add up to a more business-producing Tool Engineers' Industrial Exposition than ever before.

Extra Added Attraction

Coincidental with the Exposition, ASTE members will meet for their 16th Annual Convention and technical sessions in Cleveland. It's your big chance to sell the tool engineer . . . so make it a date for '48!

Marquee Remarks

TIME: March 15-19 • **PLACE:** Public Auditorium, Cleveland, Ohio • **PRODUCED BY:** American Society of Tool Engineers • **DIRECTED BY:** America's leading industrialists • **STAR PERFORMERS:** All Tool Engineer Industrial Exposition exhibitors • **PRICE:** No advance in prices • **RESERVATION:** Write immediately.

For complete information write the

EXPOSITION COMMITTEE

**AMERICAN SOCIETY
OF TOOL ENGINEERS**

1666 PENOBSCOT BLDG.
DETROIT 26, MICHIGAN

ideal for fuel and oil lines for engines, paint spraying air lines, machine tool coolant lines, butane-propane gas lines, rapid testing operations, and numerous other applications.

Lincoln Park Flexible All-Metal Gage Handle

A lightweight flexible all-metal handle for small diameter thread gages is announced by Lincoln Park Industries, 1719 Ferris Ave., Lincoln Park 25, Mich. Orig-

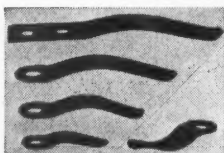


Lincoln Park Flexible All-Metal Gage Handle

inally developed for carbide wire type plug gages, the handle is said to provide flexibility which reduces pressure on the gage member and minimizes the hazard of breakage due to accident or rough handling.

The Lincoln Park Flexible Gage Handle is of the collet type and is made of metal throughout, thus assuring maximum strength and durability. It is said to be unaffected by oils. Flexible handles can be supplied in place of solid handles on Lincoln Park thread gages up to No. 10 machine screw size.

ALSCO Self-Locking Tool and Die Makers' Springs



Tool and die shops, press rooms, machine shops, etc., will find these handy neat looking springs the answer to their flat spring requirements. Made in four lengths from 1" to 2 3/4" and

eight thicknesses from .010 to .032.

Immediate Shipment. Samples Upon Request.

ALSCO COMPANY

1770 STONE RD.

ROCHESTER 13, N. Y.

micro

Supreme

LAY-OUT AND IDENTIFICATION DYE

12 COLORS*

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of stock and parts . . . Shows up in sharp relief—dries instantly—easily removed . . . Write for circular.

*Purple shipped unless otherwise specified

MICHIGAN CHROME & CHEMICAL COMPANY

6340 E. Jefferson Ave. • Detroit 7, Mich.

Motor-Mica Package

The Scientific Lubricants Co., 3469 N. Clark St., Chicago 13, Ill., announces that its Motor-Mica Anti-Friction Compound is now available in a compact handy size container. Tubular in shape, the container measures 2 3/4 x 1 1/8 inches, weighs 2 oz., and is specially designed to permit Motor-Mica to be easily carried in tool kits and otherwise conveniently handled.

Motor-Mica is described as a clean white anti-friction compound that is supplied in powdered form specially prepared for use as a general lubricating aid. It is said to reduce friction and heat to a minimum; cool hot bearings and make them run free; simplify boring, threading, drilling, tapping, die-casting, and machine shop operations, and so on.

CARROLL DIVIDING HEADS

Catalog on Request

3 SIZES - 4 MODELS - 6" to 12"

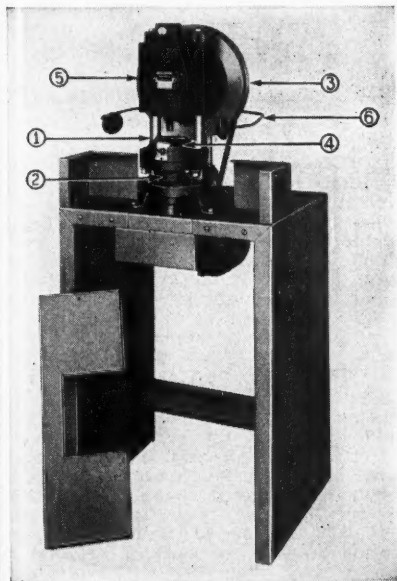
TROYKE MFG. CO.

4422 APPLETON ST. CINCINNATI 9, OHIO

Sterling Punch Press

A punch press which is said to serve the purpose of a motorized die set is now being introduced by the Sterling Factory Equipment Co., 189 Charles St., Providence, R. I. According to the manufacturer, the slide, bed, table, and die dish of the press are machined in accurate alignment in relation to the posts, thereby making dies from one press interchangeable with dies from another press.

The Sterling Punch Press includes a self-locking die dish and punch holder.



Sterling Punch Press

The table, being part of the posts on which it slides, is in positive alignment with the slide. Adjustments may be made while the press is in operation.

Meyco Carbide-Inserted Drill Jig Bushing

The W. F. Meyers Co., Bedford, Ind., announces a drill jig bushing, designated as the Meyco, which includes a tungsten carbide insert at the two points of wear to ensure unusually long bushing life and maximum accuracy for an extended

SAVE TIME, MONEY

with rugged
**QUEEN CITY
GRINDERS**



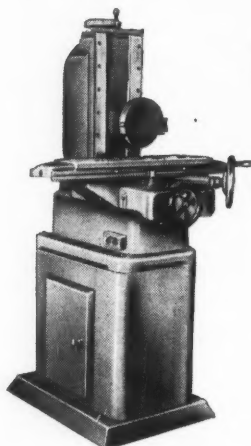
A battery of Low-Cost Queen City Grinders is real production insurance. Placed conveniently throughout your plant, they'll stop wasted work-hours caused by "ganging up" around one lone grinder. Low in cost, Queen City Grinders quickly pay for themselves in production gained. Write for Catalog.

QUEEN CITY

MACHINE TOOL CO.

233 E. 2nd St.,
CINCINNATI 2, OHIO

EXCEL Model No. 7 SURFACE GRINDER



a new hand-
feed surface
grinder in
the low-
priced field

PRICE
\$535.00

**Bench Model
(less motor)**

F.O.B.

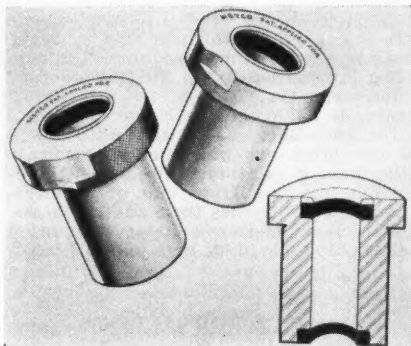
**Benton Harbor,
Michigan**

A machine designed specifically for grinding tools, dies and other tool room work. Its extra heavy construction makes it suitable also for many production jobs. Operation is simple — controls are conveniently located. **Sealed-for-Life**, ball bearing mounted spindle, hardened spiral pinion and rack, and ground cross-feed screw are your guarantee of fine finishes, smooth table operation and long, accurate machine life. Furnished in bench or floor models.

Working Surface $5\frac{5}{8}'' \times 10\frac{3}{8}''$
Longitudinal Table Travel 12"
Transverse Table Travel $6\frac{1}{8}''$
Capacity Under 7" Wheel 9"
Net Wt. Floor Model 825 lbs.

Send
for
Bulletin
MM-18

Designed and Manufactured by
COVEL MANUFACTURING CO.
BENTON HARBOR MICHIGAN



Meyco Carbide-Inserted Drill Jig Bushing

period of time. A hardened steel ring inserted above the top carbide ring is said to protect both the carbide and the drill against the shock of impact.

The Meyco Carbide-Inserted Drill Jig Bushing is made of a special alloy steel which is hardened to withstand rough usage, and is manufactured to the dimensional standards of the A.S.A.

Jakobsen Bench Grinder

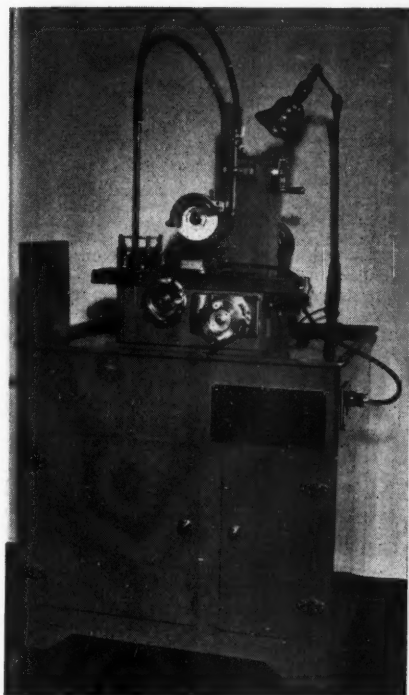
Said to lend itself very well both to repetitious production and to the making of single pieces of the most complicated form grinding nature, the Jakobsen Bench Grinder illustrated herewith is now being marketed by the Jakobsen Tool Co., 224 Glenwood Ave., Bloomfield, Zone 3, N. J. According to the manufacturer, the machine can be used in the production of razor blade dies, zipper dies and punches, flat drills, end mills, and small hardened parts of a production nature such as typewriter parts, meter and instrument parts, and so on.

The spindle speeds of the machine may be varied from approximately 300 r.p.m. to 25,000 r.p.m. using a set of six interchangeable pulleys. Through the use of interchangeable adapters, the machine can be arranged to accommodate wheels from $\frac{1}{4}$ to 5 inches in diameter, as well as diamond laps.

The Jakobsen Bench Grinder includes handwheels which are furnished with graduated adjustable rings that operate against adjustable stops. The cross-feed mechanism can be arranged to stop automatically at any given point. The machine is equipped with self-adjusting gibs that are said to eliminate the most min-

ute looseness in any of the carriages. The design also includes a water system which can be arranged in any position to cool the work. All parts of the machine which are not painted are chrome plated.

The Jakobsen Bench Grinder is supplied with a coolant tank, cabinet space, and necessary electrical wiring, ready for plugging into a 110-volt socket. The magnetic chuck of the machine measures



Jakobsen Bench Grinder

4 x 6 x 2 $\frac{1}{4}$ inches high. A clearance of 6 inches is provided between the top of the chuck and the bottom of a 5-inch grinding wheel.

Standard Model 108 Comparator

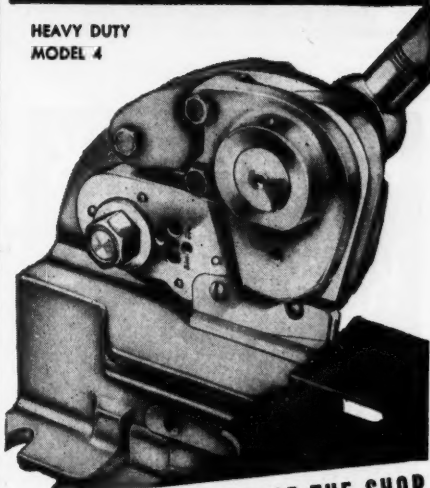
Provisions for five interchangeable tables and the use of standard indicators are features of the Standard Model 108 Comparator developed by the Standard

SAVE TIME 4 WAYS WITH A

HEINRICH

HANDNIB

HEAVY DUTY
MODEL 4



USE THIS HANDYMAN OF THE SHOP
FOR:

- ☐ OUTSIDE NIBBLING
- ☐ INSIDE NIBBLING
- ☐ SHEARING
- ☐ ROD CUTTING

● It's easy to cut irregular shapes with Heinrich No. 4 Handnib. Double crank construction does the trick . . . enables tool makers to speed up cutting of templates and trial blanks. It's rugged . . . takes 3/16" flat stock with ease . . . round stock to 3/8". May be clamped in a vise or mounted on a bench. A request brings folder with full details.

NATIONAL MACHINE TOOL CO.

DEPT. 118-A

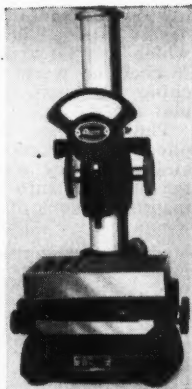
RACINE, WISCONSIN

Gage Co., Poughkeepsie, N. Y. Suited to a wide range of production and inspection measuring jobs, the comparator, when equipped with a Micronar indicator, is said to afford a simple and effective means of checking plug gages.

The Standard Model 108 Comparator can be used with any AGD dial indicator of the No. 2 or 3 size having a standard lug type back. Thus, an indicator having graduations appropriate to the accuracy desired may be mounted on the comparator. With the Micronar indicator, measurements can be made to an unusual accuracy.

Raising, lowering, and approximate po-

sitioning of the indicator support arm are facilitated by a rack located on the rear of the column of the comparator. Fine adjustment for setting the comparator to a standard is effected by a wing handle. Pressure of the contact point on the workpiece can be regulated by means of a knurled bushing. A reed mechanism located within the head is said to prevent side thrust from reaching the indicator and thus adversely affecting accuracy.



Standard Model 108 Comparator

The Standard Model 108 Comparator can be obtained equipped with a $1\frac{1}{2}$ x 4-inch serrated table, 6 x 4-inch serrated table, $1\frac{1}{2}$ x 4-inch plain table, or a table with $1\frac{1}{2}$ -inch diameter rolls for checking local conditions.

DIAMONDS
FOR WHEEL DRESSING TOOLS

DIAMONDS
FOR THREAD GRINDING TOOLS

DIAMONDS
FOR ALL INDUSTRIAL PURPOSES

KOEBEL

KOEBEL DIAMOND TOOL CO.
9456 Grinnell Avenue, Detroit 13

Wilder Model B Projector and Optical Comparator

Designated as the Wilder Model B, a projector and optical comparator suitable not only for continuous quantity inspection but also for the performance of delicate assembly operations on minute parts in the watch, instrument, and electronic tube industries has been placed on the market by the George Scherr Co., Inc., 198-A Lafayette St., New York 12, N. Y. The work stage and observation screen of the unit are located close to each other within the operator's easy reach and line

12" 

(FROM $\frac{1}{8}$ " to $\frac{1}{2}$ "—BY $\frac{1}{64}$ "s INCLUSIVE)

DRILLS!

12" LONG

HIGH SPEED STRAIGHT SHANK DRILLS
9-Inch Flute
Immediate Delivery

Eastern Tool Supply Co., Inc.
176 Grand St., New York 9, N. Y.

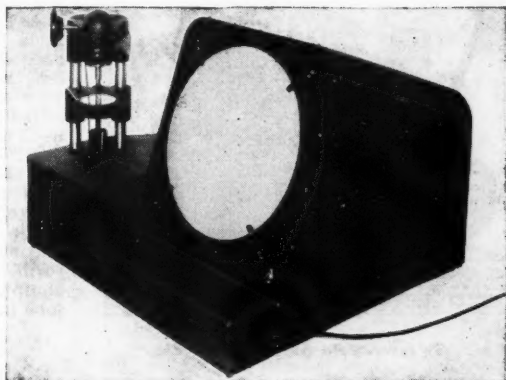
FREE COPY
MACHINE SHOP CATALOG—125 page fully illustrated catalog describes a large variety of drills, reamers, cutting and lathe tools, vises, etc.

Wilder Model B Projector and Optical Comparator

of vision respectively.

Through the overhead location of the lamphouse, both the stage and screen remain entirely unobstructed, thus providing the operator complete freedom of action. This arrangement results in a vertical beam of light and a horizontal work stage, the most natural position for the majority of work. It also provides for protection to the operator against any discomfort from heat radiated by the projection lamp. Additional comfort in the operation of the unit is provided by an arm rest which is an integral part of the cast base.

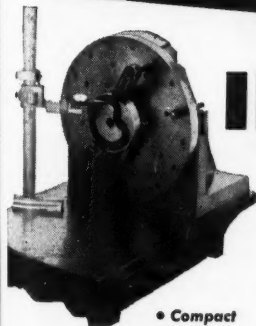
When used for shadow images, the Wilder Model B Projector and Optical Comparator offers a choice of six different magnifications; namely, 10, 20, 31 $\frac{1}{4}$, 50, 62 $\frac{1}{2}$, and 100X. A special surface illuminator is available as extra equipment for reflective images in 10 and 20X magnification. The large, circular screen is 14 $\frac{1}{2}$ inches in diameter.



Tweezer-Weld Automatic Welder

The Tweezer-Weld Corp., 1060 Broad St., Newark, N. J., announces the development of a machine which is designed for the automatic welding and shaping of light, small parts by means of an electric welding and timing device. The assemblies or small parts are fed to a turret either by hand or automatically from a hopper. The equipment is said to be particularly effective in attaching light wire

NOW A NEW ERA IN INSPECTION
...The Sine Bar is Dead!



- Compact
- Portable
- Ready for Instant Use



CLEVELAND REPUBLIC TOOL CORPORATION

Sales Office: 1265 UNION COMMERCE BLDG., CHerry 1927 • Main Plant: 9613 MEECH AVE., Diamond 7300

CLEVELAND, OHIO

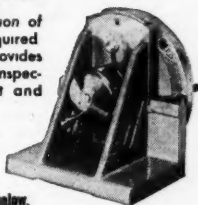
For Fast, Accurate, Low-Cost Precision Inspection

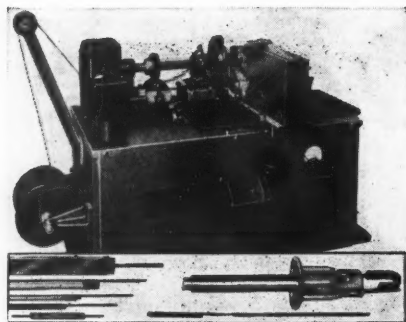
Here's the answer for speed combined with accuracy and precision in inspection. So simple that even a semi-skilled mechanic can perform the most critical inspection

operation in a fraction of the time normally required. The Indexmaster provides the utmost in faster inspection, greater output and reduced costs.

ELIMINATES the Sine Bar in inspection operations.
CHECKS angles with standard "Jo" Blocks.
SPEEDS layout of cams, jigs, fixtures, gauges, etc.

Ask your distributor for full information—or write the address below.





Tweezer-Weld Automatic Welder

from a spool to parts fed automatically. Before or after the welding process, components can be shaped so that the welded parts, when they leave the machine, are ready for assembly into the final product.

One of the principal uses for the Tweezer-Weld Automatic Welder is the welding of tabs to radio tube cathodes. The machine is said to be capable of produc-

ing approximately 3,000 cathode assemblies per hour without the use of an arbor. It is designed to handle round and flat cathodes from 0.020 to 0.125 inch O.D., lengths from $\frac{5}{8}$ to $2\frac{1}{2}$ inches, and tab wire as fine as 0.002 x 0.006 inch. With adjustments, the equipment can also be used to weld bi-metal strip to a two-piece lead, forming the bi-metal and cutting the bi-metal to length.

In the production of fluorescent light starter stems, the Tweezer-Weld Automatic Welder can be arranged to automatically trim off starter stem leads and form, weld, and cut the bi-metal. The equipment can also be adapted to other jobs involving the welding of small parts.

Diamond Plain Type Punch Press

Designed to strain gauge analysis, a plain type punch press is now being offered in 55 and 56-ton capacities by the Diamond Machine Tool Co., Los Angeles, Calif. The press frame is of open-back inclinable construction, the sections being designed to provide increased strength at points of maximum stress. All bearing and sliding surfaces are micro-finish-

***A New TOOL
THAT SOLVES
AN Old PROBLEM!***

**'NTS' CARBIDE DRILLS FOR
RAPID DRILLING OF CLOSE
TOLERANCE HOLES IN
STEEL AS HARD AS 66-C**

The tool that's been needed for years in production as well as tool and die shops. Drills holes faster. Drills more holes per grind. Will not anneal or discolor work. Each hole perfect as though drilled before hardening.

WRITE FOR OUR CATALOG.



ARE YOU DISCARDING WORN
TOOLS THAT CAN BE SALVAGED
FOR OTHER OPERATIONS?
NATIONAL RECLAIMS DAMAGED
AND WORN TOOLS FOR A FRACTION
OF REPLACEMENT COSTS.

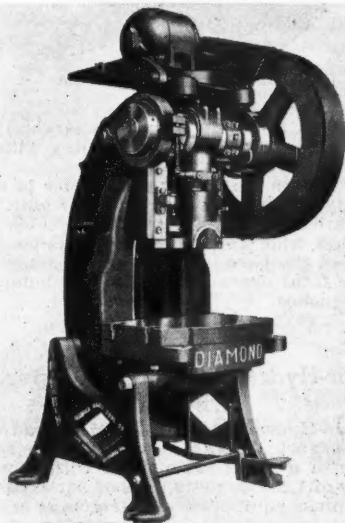
NATIONAL TOOL SALVAGE COMPANY

6911 EPWORTH BOULEVARD • DETROIT 10, MICHIGAN

ed to assure longevity and smooth, accurate operation.

The clutch employs three sets of driving dogs engaging the flywheel at any 120-deg. angle of rotation. The clutch dogs are oversize, being fully supported within the clutch housing. This additional support is said to eliminate practically all bending stress, thus placing each dog almost entirely in shear. As a result, fatigue failures at this vital point are claimed to be entirely eliminated.

Specifications of the 56-ton model are as follows: maximum number of strokes per minute, 100; standard length of



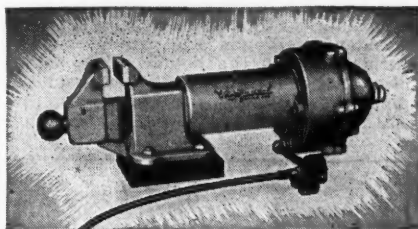
Diamond Plain Type Punch Press

stroke, 3 inches; maximum length of stroke to order, 8 inches; shut die height, 16 inches; bed area, 20 x 30 inches; bed opening, 12 $\frac{1}{2}$ x 16 $\frac{1}{2}$ inches; diameter of crankshaft at bearings, 4 inches; and diameter of crankshaft at crank, 5 inches.

Bub Master Shank Holder

To meet the need for a versatile holding device for punch holders, die holders, toolholders, shanks, adapters, and shank tools of all kinds, George F. Bub & Son, 11413 Madison Ave., Cleveland 2, Ohio, has developed the Bub Master

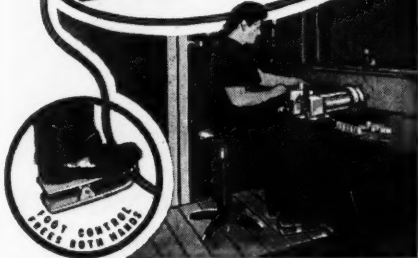
AIR VISE ZERO to 3 $\frac{1}{2}$ TONS AT JAWS



FOOT-CONTROLLED FREES BOTH HANDS

Vi-Speed is more than a holding tool—it's a powerful foot-controlled air-powered unit that permits fast filing, crimping, bending, forming, chipping, riveting, etc. and thru adjustable air control is able to handle a wide range of light or heavy work. *Vi-Speed* is safe, for movable jaw cannot close beyond the selected position and objects held in jaws cannot work loose—only foot pedal action will release the piece. Maintenance is nil. Immediate delivery. Write for new catalog.

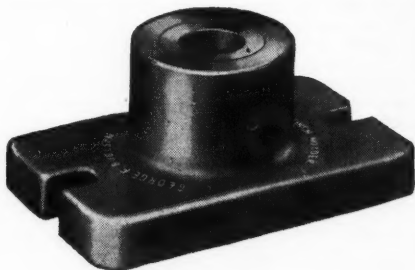
VAN PRODUCTS CO.
431 ERIE TRUST BLDG., ERIE, PA.



Shank Holder illustrated herewith. The body of the holder is a close grained gray iron casting. The top of the boss, the hole, and the bottom of the base are precision machined square, parallel, and true to each other. The smoothly cast unmachined surfaces of the unit are painted.

A set screw is provided in the side of the boss for holding the work in place. Clearance for this screw is provided in the standard hardened and ground bushing furnished with the holder. The bushing is available in either of three inside diameters of $1\frac{1}{4}$, $1\frac{1}{2}$, or $1\frac{3}{4}$ inches. Special bushings or adapters can also be ob-

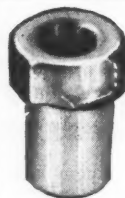
tained for individual requirements. Clamping slots at each end of the base enable the holder to be fastened to machine tables, faceplates, or to a larger



Bub Master Shank Holder

plate so that punch holders larger than the base may be held for drilling without tipping over.

The Bub Master Shank Holder is ruggedly constructed to provide for long, accurate life. The base is 1 inch thick x 5 inches wide x 8 inches long. The boss on top of the base is $3\frac{1}{2}$ inches in diameter. The total overall height of the holder is $3\frac{1}{2}$ inches.



ACE

DRILL JIG BUSHINGS

A.S.A. STANDARD
Immediate Delivery
on standard sizes

Fast service on specials

(Write for Catalog and Discount Sheet)

WEST COAST AERO TOOL CO.

5401 Fountain Ave. Hollywood 27, Calif.

**DON'T WAIT UNTIL TAPS
BREAK OFF — and then
wish you had a set of
WALTON Tap Extractors**



Have them on
hand for this
emergency.

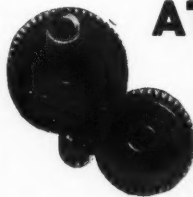
Remove
Broken Taps
Quickly and
Easily.

Write for folder
No. 10 and full
details of 30 DAY
FREE TRIAL
OFFER.

THE WALTON COMPANY
Hartford, Conn.

**Air-Hydraulic 1,200-Lb. Capacity
Arbor Press**

Air-Hydraulics, Inc., 401 Broadway, New York 13, N. Y., announces the addition of a small arbor press with a capacity of 1,200 lb. to its lines of Air-Hydraulic press equipment. The machine can be used in performing assembling, flanging, broaching, forming, marking, riveting, crimping, staking, and other operations. The pressure of 1,200 lb. is based

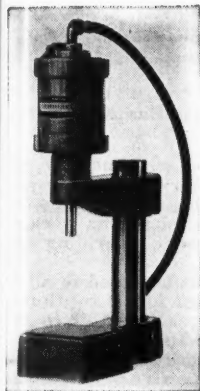


**ATLANTIC
For GEARS**

Our service on small gears, due to new equipment recently installed, will interest you. Send samples or blueprints for quotation.

ATLANTIC GEAR WORKS, INC.

198 A Lafayette St., N. Y. 12, N. Y. CAnal 6-1441



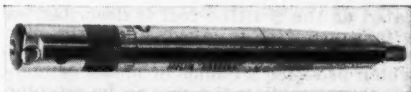
Air-Hydraulic 1,200-Lb.
Capacity Arbors Press

on an air inlet pressure of 100 lb. (12 to 1 ratio).

Constructed with heavy ribbed castings and a solid steel shaft that affords a vertical adjustment of up to 6 inches, the Air - Hydraulic 1,200-Lb. Capacity Arbor Press has a 6-inch throat, 2½-inch stroke, ¾-inch ram, and 5-inch square platen. Lugs in the base make the press suitable for bench mounting. The unit is available with either spring or power return, the spring return model having a single-acting cylinder and the power return model a double-acting cylinder and 4-way valve.

Melin "Precise" Boring Bar

Designed to provide for maximum ease of adjustment and high precision accuracy, an adjustable boring bar for use on milling machines, turret lathes, jig borers, and horizontal boring mills, to



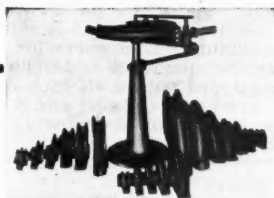
Melin "Precise" Boring Bar

be known as the Melin "Precise" Boring Bar, is announced by the Melin Tool Co., 3370 W. 140th St., Cleveland, Ohio.

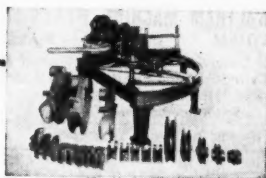
The bar is adjusted on the same principle as a micrometer and is said to be especially adapted for boring long holes and holes that are difficult to reach, for boring inside a casting which is larger in diameter than the outside hole, and for bottoming. The tool can be easily removed without changing the adjustment on the machine, and the tool bit is removable for either sharpening or replacement.



**BY HAND or MOTOR
MACHINES TO BEND COLD PIPE, CONDUIT, BOILER TUBING
AND SOLID BAR . . . BENDING TABLES ALSO AVAILABLE**



Above: Hand-powered Type A-30 . . . up to 180° bends . . . all sizes from ½" to 2". Only 7 parts. World's fastest, simplest machine. Note assortment of bending dies . . . this process makes shorter tangents than any other. Occupies only 18" x 18" floor space!



Above: Motor-powered Type E . . . bends fixed radii of 6 to 1 up to 90°. Type E bends 2½", 3", 3½" and 4" pipe. 3 horse-power motor. Floor space occupied—7' 6" x 7' 6". Other power machines up to 8" capacity.

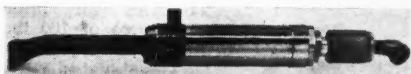
Other Sizes Available

**Factory and Main Office: 14 Furnace St.,
Poultney, Vermont**

**"American"
PIPE BENDING MACHINE
Company INC.**

Rotor S-1 Scaling Hammer

The Rotor Tool Co., 17325 Euclid Ave., Cleveland, Ohio, announces a scaling hammer for weld flux scaling, weld spatter removal, paint scaling, rust removal, removing fins from castings, peening, chipping, star drilling, and so on. Designated as the S-1, the tool is described as a fast-operating, rugged, and light unit with a graduated control in the throttle which provides a choice of blows delivered, thus enabling the tool to be adapted to a wide variety of production and maintenance work. Light pressure on the

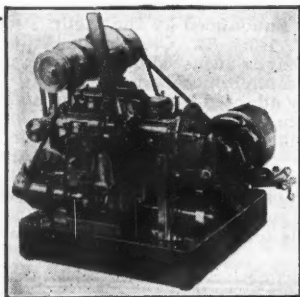


Rotor S-1 Scaling Hammer

valve is said to meter sufficient air for light work, with heavier pressure providing ample power for heavy cuts. The exhaust air is claimed to clean the work of chips and scale, thereby providing for maximum visibility.

The chisel retainer is designed to allow for easy removal of the chisel by thumb pressure. A square broached hole in the nose is said to eliminate the need for a nose bushing and guides the chisel at all times. The wafer type valve of the tool is of stainless steel and is simply and compactly constructed.

The Rotor S-1 Scaling Hammer weighs 3 lb. and measures 10 1/4 inches long without chisel. Chisels can be furnished in blank form, flat form, or spoon form. A full line of star drills is available in sizes from 7/8 to 3/4 inch.



WALTHAM

Pinion and Gear Cutting Machines

with revolving cutter will make 1, 2 or 3 successive cuts for watch pinions or may be used for fine pitch gears up to 1 1/2" dia. Revolving cutter makes successive cuts on blanks held and indexed by work spindle and usually supported by a tail center. Only straight teeth can be cut. Write for Bulletin No. 112.

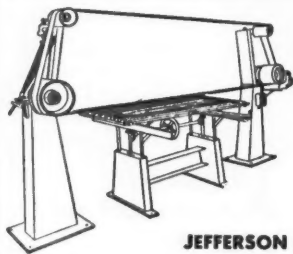
WALTHAM MACHINE WORKS

WALTHAM MASS.

Pinion and Gear Cutting Machine, Thread Milling Machine, Cylindrical Sub-Presses, Cutter Sharpening Machine, Small thread milling and gear cutters, Small special machinery.

Hannifin Models M-1 and M-2 Air-Operated Arbor Presses

To meet present-day needs for fast-operating, economical, semi-automatic equipment suitable for production operations, the Hannifin Corp., 1101 S. Kilbourn Ave., Chicago, Ill., is now manufacturing two air-operated arbor presses designated as the Models M-1 and M-2. Each Model features a push-button controlled electric valve which is said to eliminate manual valve operation and to speed up the operating cycle. The Model M-1 is equipped with a 4 1/2-inch diameter x 4-inch stroke air cylinder and is arranged to develop a ram pressure up to 1,270



save time . . . save money

JEFFERSON ENDLESS BELT SANDING MACHINE

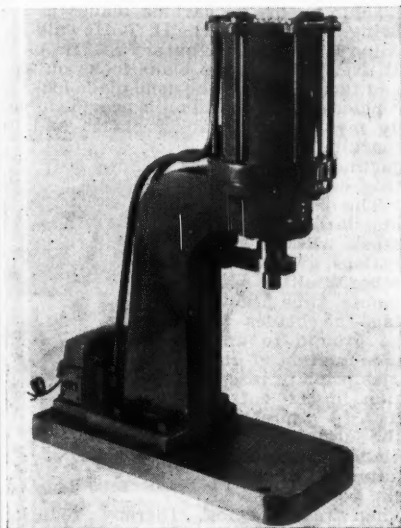
Eliminate waste of time and money. Do away with manual handling. This machine finishes wood surfaces to satiny smoothness at 5,000 surface feet per minute. Large flat, convex or concave surfaces.

Order Today for Three Weeks Delivery
Representatives: Write for money-making Deal

JEFFERSON MACHINE TOOL CO., 702 W. 4th St., Cincinnati 3, Ohio

lb. with 80 lb. air line pressure. On the Model M-2, the cylinder measures $6\frac{1}{2}$ inches in diameter x 6 inches and is said to be capable of drilling ram pressures up to 2,650 lb. In each model, the stroke can be varied to meet work requirements.

The Hannifin Models M-1 and M-2 Arbor Presses are designed for bench mounting and are quite similar except that the Model M-2 is built to accommodate larger work. In the M-2, the gap distance from the table to the ram in its up position is $12\frac{1}{4}$ inches. In the M-1, the gap is 6 inches. The M-1 weighs approximately 210



Hannifin Model M-2 Air-Operated Arbor Press

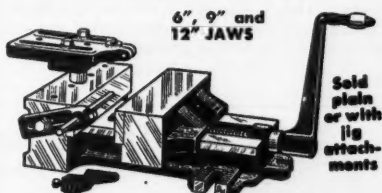
lb. while the M-2 weighs 375 lb. Either model can be supplied without a base for special mounting and is said to be especially applicable to many ordinary press-fit assembling operations performed in the manufacture of electric motors, small tools, and bearing parts. The presses are also claimed to be suitable for light stamping, marking, and die-cutting operations.

Super Carbide-Tipped Drill

For the use of shops which frequently find it necessary to drill holes in dies, fixtures, and so on, after the metal has

BASIC UNIT

for repeat-operation
positioning of work



GRAHAM MULTI-PURPOSE VISE

Finished with surfaces flush, parallel and square, this vise forms a Basic Unit for precision holding, and is designed to add **STOPS, GUIDES, SHELL JAWS, V-JAWS, BUSHING PLATES, ETC.**

Ready-made jig or fixture saves many toolmaking hours.

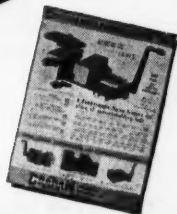
Use this vise to form the central basic holding unit for production operations on drill press, radial, planer, miller, shaper, grinder. Accurately finished. Heavily constructed to maintain uniform position of work under heavy cuts. Sizes up to 124 lbs. We furnish numerous attachments—easy to add others for holding wide variety of irregular shapes.

"Adjust-angle" KNURL HOLDER



Fitting lathe
turret

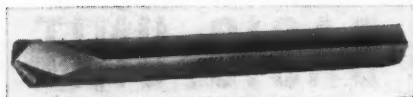
Requires only
straight knurls
to cut many
different pat-
terns on work
up to $2\frac{1}{2}$ " dia.



Send for Illustrated
Price Bulletin 41

Graham Mfg. Co.

39 Bridge St. East Greenwich, R. I.

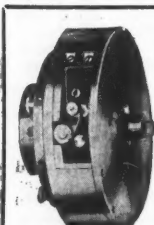


Super Carbide-Tipped Drill

been hardened, the Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich., announces a standard carbide-tipped drill designed specifically for this purpose. The drill is available in 10 sizes ranging from $\frac{1}{8}$ to

$\frac{3}{4}$ inch and is supplied complete with an instruction sheet.

According to the manufacturer, the Super Carbide-Tipped Drill provides for excellent results, even on deep holes, regardless of the Rockwell hardness of the metal being machined. The tool can be used either dry or with coolant and is intended for feeding by hand.



M - D Facing Heads

With Automatic Feed

Can be attached to Boring Mill Bar, and Drilling or Milling Machine spindles. Single point tool travels radially, from center outward or reverse; feeds automatically. Sizes 6" to 46" diameter.

Write for circular.

MUMMERT - DIXON CO.
120 PHILADELPHIA ST. HANOVER, PA.



This TRADE MARK is
Your Guarantee to
**QUALITY and
PRECISION**

Micro Miniatures

Small Precision Ground
END MILLS

| STOCK SIZES | | BALL ENDS | |
|------------------|---------------|------------------|---------------|
| $\frac{1}{16}$ " | - 2 - Flute | $\frac{1}{16}$ " | - 2 - Flute |
| $\frac{1}{8}$ " | - 2 - Flute | $\frac{1}{8}$ " | - 2 - 3 Flute |
| $\frac{3}{16}$ " | - 2-3-4 Flute | $\frac{3}{16}$ " | - 2 - 3 Flute |
| $\frac{1}{4}$ " | - 2-3-4 Flute | $\frac{1}{4}$ " | - 2 - 3 Flute |
| $\frac{5}{16}$ " | - 2-3-4 Flute | $\frac{5}{16}$ " | - 2 - 3 Flute |
| $\frac{3}{8}$ " | - 2-3-4 Flute | $\frac{3}{8}$ " | - 2 - 3 Flute |

Special Sizes to Fit Your Job

Also Immediate Delivery

MILLIMETER SIZES 1-2-3-4-MM

Single or Double End All Sizes 3/16" Shank.
Call your dealer or write

WOODSON TOOL CO., INC.

4811 1/2 W. Lennox Blvd., Inglewood Cal.

Howald Carbide Milling Cutters

A line of carbide milling cutters especially designed to provide maximum machining life to carbide blades is now being marketed by the H. T. Howald Machine Works, 182 Sigourney St., Brooklyn 31, N. Y. The sharp blade locks on shell and face mills and the cone blade locks on replaceable blade end mills provide a handy means for replacing blades and for marking blade adjustments for setting or grinding.

The blades are of standard square stock without serrations, grooves, or other limiting elements, thus allowing the blades to be ground to any combination of angles prior to insertion in the cutter head. Moreover, the design of the blades permits a minimum of material to be removed when resharpening, thereby reducing grinding time and assuring long blade life. If desired, blades of cast alloy or high speed steel can be used.

The replaceable blade end mills are said to be ideally suited for small milling jobs



Howald Carbide Face Mill

BEVEL GEARS

PROMPT DELIVERY

UP TO 12" DIAM. - 3 D. P.

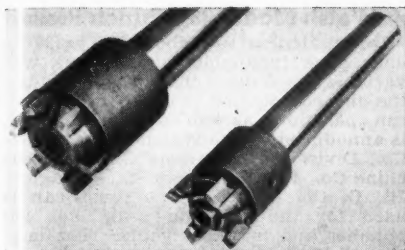
CUTTING ONLY or COMPLETE GEARS

LATEST GLEASON EQUIPMENT



Greaves MACHINE TOOL CO.
80 2015 Eastern Ave.
Cincinnati, Ohio





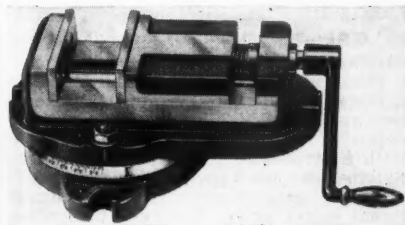
Howard Carbide End Mills

and are made in diameters from $\frac{1}{2}$ to 3 inches with 4 to 6 blades. The shell mills, which are intended for light or heavy duty work, are available in sizes ranging from 3 to 6 inches in diameter with 6 to 12 blades. The face mills, which are designed for heavy duty work, are available in sizes from 8 $\frac{1}{2}$ to 14 inches in diameter with 10 to 12 blades.

L-W 3-Inch Swivel Base Vise

A 3-inch swivel base vise suitable for milling machines, shapers, grinders, and drill presses has been announced by the L-W Chuck Co., 28 S. St. Clair St., Toledo, Ohio. The unit has a graduated base and can be used as a plain or swivel vise. Large Acme screws are said to contribute sturdiness and durability.

The width of the steel jaws of the vise is 3 inches and the depth 1 inch. Four bolt and key slots are provided for attaching the vise firmly to the machine



L-W 3-Inch Swivel Base Vise

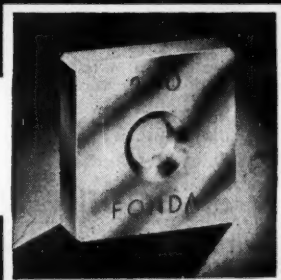
table so that the work-holding surfaces are at true right angles to the table. The weight of the vise, including the crank, is 16 pounds.

NOW FONDA

Lifetime-Carbide

FOR

Every GAGE-BLOCK User



SQUARE

and Rectangular

Square style gage blocks of Lifetime Carbide are now available for new use as replacement in any square gage block set.

INDIVIDUAL BLOCKS & COMPLETE SETS

- Need never be recalibrated
- Outlast more than 100 steel gage blocks
- Will never grow or shrink
- Have the highest resistance to corrosion
- Retain original surface finish longest

FONDA

GAGE CO.

STAMFORD, CONN.

FREE
SEND FOR CATALOG
46-1



QUICK CHANGE HOLDERS and TYPE

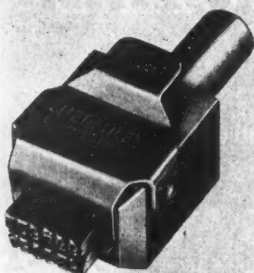
FOR STAMPING STEEL

HERCULES
REGISTERED



**SINGLE LINE
or DOUBLE LINE**

USED WITH A HAMMER OR IN A
PUNCH PRESS TO SPEED UP YOUR
NUMBERING AND LETTERING JOBS.



THUMB
PRESSURE
RELEASES
BOTH
LINES OF
TYPE FOR
QUICK
CHANGE
OF
NUMBERS
OR
LETTERS

CARRIED IN STOCK

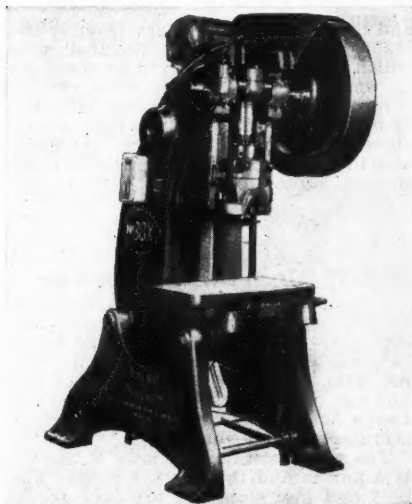
ORDER YOUR HERCULES HOLDER AND
TYPE TODAY. PRICES SAME AS 1941.
ILLUSTRATIVE FOLDERS READY.

THE ACROMARK CO.

MORRELL STREET, ELIZABETH 4, NEW JERSEY

Walsh Model 38X Punch Press

Designated as the Model 38X, a 38-ton open back inclinable punch press with variable speed drive that is said to adapt the unit equally well to toolroom and test-run operations, as well as production jobs, is announced by the Walsh Press and Die Co., Division of American Gage and Machine Co., 4709 W. Kinzie St., Chicago 44, Ill. In the toolroom, the press can be used for the shearing-in of dies and punches and for die tryouts. The large shut height and bolster plate area are said to make the press readily adaptable



Walsh Model 38X Punch Press

to certain notching, forming, and die-casting trimming operations.

The Walsh Model 38X Punch Press has a distance between gibs of 17 inches, a bed area of 18 x 26 inches, and a throat depth of 12 inches. It can be furnished with a stroke up to 6 inches in either a flywheel or back-gear type and with either a variable speed drive or conventional motor drive. Standard design features include heat-treated, ground, die-forged tool steel crankshafts; replaceable hard bronze main and connection bearings, hand scraped for proper bearing clearance and pressure distribution; semi-steel frames of high tensile strength specifications; and parts capable of withstanding considerable overload.

Numberall Long Taper Stamp and "Pik Quik" Stamp Index Stand

Featuring chamfered corners which are designed to facilitate and aid in the correct spacing and aligning of letters when



Numberall "Pik-Quik" Stamp Index Stand

stamping, a long taper stamp made of tough tool steel of heavy stock and bevel and with deeply engraved letters and figures has been announced by the Numberall Stamp & Tool Co., Huguenot Park,

Staten Island 12, N. Y. The top part of the stamp is tempered for safety, and the character and size are shown on the thumb side of the stamp to allow for quick identification of the character and the correct size of stamp to use.

For holding a complete set of the long taper stamps, an index stand known as the "Pik Quik" is available which is designed to save time and speed up stamping work. Any character of long taper stamp can be quickly picked up and replaced in the index stand, thereby keeping the stamps in perfect order.

"Murco" Tumbling Barrel

A streamlined tumbling barrel which is said to have special features of interest to manufacturers that deburr, burnish, clean, polish, and smooth-surface metal and plastic parts on a production basis is now being marketed under the trade name of "Murco" by the D. J. Murray Manufacturing Co., Wausau, Wis. Compactly constructed and simply designed to provide for low maintenance, the unit is arranged so that speed changes may be effected while the barrel is in motion, thus affording a wide range of speeds to

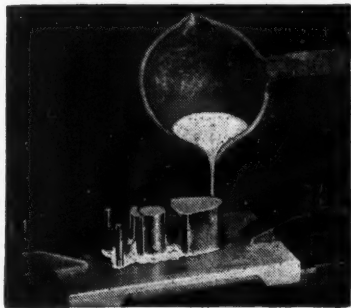
CUT DIE MAKING COST WITH CERROMATRIX

Leading manufacturers in this country and Europe use the fast, accurate Cerromatrix Method of locating punches in relation to dies, without machining non-working surfaces to close dimensions. Dies and punches permanently secured for long runs.

Attach coupon to your letterhead to receive 36 page Cerromatrix Manual.

CERRO DE PASCO COPPER CORPORATION

Dept. 10 • 40 Wall Street • New York 5, N. Y.



CERRO DE PASCO COPPER CORP.,
Dept. 10, 40 Wall St., New York 5, N. Y.
Please send me a copy of your
Cerromatrix Manual.

Name _____ Title _____
Company _____
Address _____
City _____ State _____

meet various operating conditions and requirements.

Specially designed dump pans are available which are mounted on casters and provided with bail handles notched for a crane hook. The discharge end of each pan is funnel shaped so as to fit into the compartment opening to facilitate barrel loading. Separating screens of various wire mesh can be mounted in frames to fit the dump pans.

All moving parts of the machine, such as the barrel, gears, pulleys, and motor, are protected with a guard rail, steel enclosures, and concealed design for

High Speed Cutting Tools

- Special high speed circular, dovetail, flat form and special tool bits.
- Design and manufacture of small machines, jigs, gages and experimental parts.
- Regrinding and salvaging high speed flat form, special bits and small flat broaches.

Write for quotes.

Attractive Proposition for Representatives

LINCOLN PARK MANUFACTURING CO.

3304 Dix Road

Lincoln Park, Mich.

Easy TO REDUCE SET-UP TIME!



You'll be surprised at how much time the Ziegler Holder will save you in making tapping and reaming set-ups because of its ability to compensate for alignment inaccuracies of as much as 1/32" radius or 1/16" diameter.

Once you try it out, you'll never again be satisfied with ordinary tool holders.

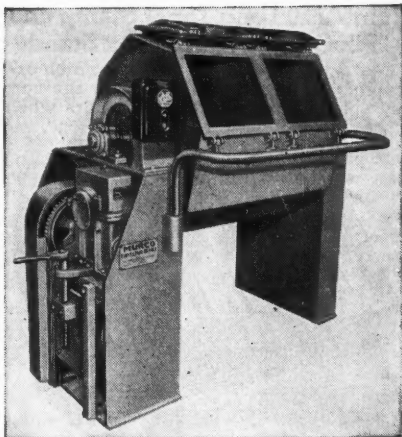
W. M. ZIEGLER TOOL CO.

1928 Twelfth St., Detroit 16, Mich.

Ziegler
ROLLER
DRIVE

WRITE FOR
CATALOG

FLOATING HOLDER
for Taps and Reamers...



"Murco" Tumbling Barrel

safety of operation. Although light in weight, the frame and barrel are built to withstand heavy duty service.

Palmer-Shile Pallet Rack and Nesting Ring

An all-metal single-face pallet rack and nesting ring for use with power or hand trucks is announced by the Palmer-Shile Co., 16022 Fullerton Ave., Detroit 27, Mich. The rack can be furnished with the nesting ring permanently welded to the pallet if specified.

According to the manufacturer, the pallet rack is especially designed for heavy industrial use and may be built to suit specific requirements or load specifications. The rack is of special rolled channel steel with reinforced all-welded



**PRESSES
FEEDS
AUTOMATIC
EQUIPMENT**

The V & O Press Company, Incorporated
HUDSON, NEW YORK



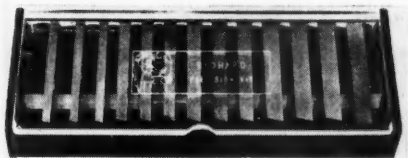
Palmer-Shile Pallet Rack and Nesting Ring

channel support to permit easy handling of excessively heavy loads. It is said to be ideally suited for the rapid handling of heavy irregularly shaped pieces or parts of various sizes. Sturdily constructed steel legs provide the rack with an adequate height to permit complete accessibility from all four sides. The rack is attractively finished in an air-dry enamel.

Redhard Precision Tool Bit Kit

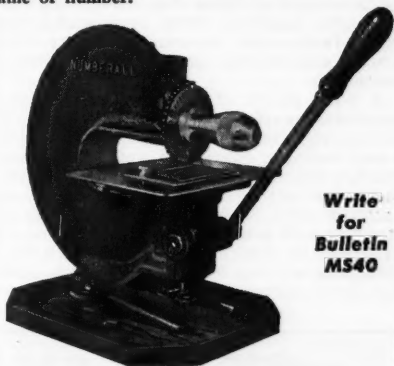
Redhard Metals Inc., N. York Rd., Hatboro, Pa., is now marketing a precision tool bit kit which consists of a special Plexiglas box containing 12 tool bits from $\frac{1}{16}$ to $\frac{3}{8}$ inch square inclusive in three grades of cutting metal; namely, Redhard P. S. (precision high speed steel), Redhard P. N. (precision non-ferrous), and Redhard P. C. (precision carbide). The P. N. and P. C. are tipped tools. Also included in the kit is a special honing stick.

Redhard Precision Tool Bit Kit



NAME PLATE DETAIL PRESS

Model 40 is for stamping details on name plates. Eliminates irregular and unsightly stamping on name plates, tags, etc. Available in $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, $1\frac{1}{4}$, $1\frac{1}{2}$ size characters. Dials contain all the letters and figures, diagonal line, and sign, dash, period. No experienced operator required. Steel, zinc, brass, fiber, etc., can be indented with a name or number.



Write
for
Bulletin
MS40

AUTOMATIC INDENTING NUMBERING

HEAD • MODEL 50

Automatic indenting numbering head for consecutive or repeat numbering. $\frac{1}{32}$ " up to $\frac{3}{8}$ " high figures can be furnished in sharp face Gothic or shaded Roman figures. Prefix or suffix letter wheels. Bench, foot, or power presses can be used. Numbers: radio, airplane, tool parts, name plates, and other objects in brass, steel, fiber, plastics. Heads are of sturdy construction and give uninterrupted marking service.

Model
50



NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.

New Books

DoAll Contour Saws. 12th edition. Published by The DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill. 416 pages, 6 x 9 inches. Cloth binding, board covers.

Revised and enlarged in order to include a new section on instruction programs for use in a shop or school training course, this volume explains, with the aid of photographs, charts, and drawings, the techniques for contour sawing and filing, as well as high speed sawing and the friction cutting methods with band sawing equipment. It compares the performance of these machines with other basic machine tools and elaborates with facts and figures recommending proven procedures for sawing all types of materials.

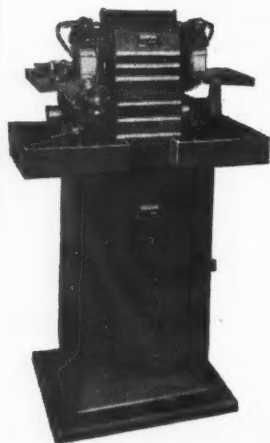
A wide range of contour saw and file applications is shown leading into the second part of the book, which embodies a self-training course for apprentices and machinists. This section provides a complete instruction course on contour machining with 23 work projects, demonstrating, and grading tables for a trainee's progress in passing tests. The instruction program has been laid out as a guide for encouraging trainees to develop new

applications and techniques and to recognize machining short-cuts possible with sawing machines. Shop work projects follow classroom instruction in which careful workmanship and proper machine adjustment and maintenance are emphasized.

The factual information and training outline contained in the book is said to appeal to plant managers, engineers, tool-room foremen, and individuals concerned with machining methods or time and cost studies. Industrial and educational reference libraries and instructors of industrial or vocational trainees should find the book helpful and informative. Free copies of the book can be obtained by individuals addressing requests on their company letterheads to The DoAll Company at the address given above.

Simplified Perspective. By William Wirt Turner. Published by The Ronald Press Co., 15 E. 26th St., New York 10, N. Y. 236 pages. Illustrated. Cloth binding, board covers. Price, \$5.00.

Designed to fill the need for a book that will set forth the basic principles of perspective drawing in a thorough, but not too technical, manner, this volume's at-



WILLEY'S NEW CARBIDE TOOL GRINDER

Willey's new 50-A Grinder is compact and designed for the rapid, economical grinding of carbide tipped tools as well as other types of tool bits that require keenest cutting edges and extreme accuracy. It handles rough, semi-finish and finish grinding of tool bits having up to 2" square or equal cross section area. Bronze bearing trunnions support the tool rest table $\frac{3}{4}$ " below work center, permitting grinding tools from $\frac{3}{16}$ " to $\frac{3}{4}$ " square without further horizontal movement — a Willey's feature that speeds production.

WRITE FOR FOLDER

Complete specifications and illustrations of this new Willey's Grinder Model 50-A.

DEALERS: An attractive proposition open in certain territories.

WILLEY'S CARBIDE TOOL CO.

SOLE MAKERS OF WILLEY'S METAL

1342 W. Vernor Highway

Detroit 1, Michigan

tempts to lead the beginning student step by step from first principles to those which are more advance, enlisting the reasoning faculty throughout, to the end that the student will acquire, as a matter of habit, the ability to make drawings understandingly, rather than by imitation or by memorized routine. The book is largely an outgrowth of lecture notes and drawing problems accumulated during many years devoted by the author to the professions of architecture and teaching. Guiding principles are amply illustrated and on the illustrations are notes which explain, then and there, both the construction and the reason therefor.

The book is divided into eight chapters, at the end of each of which are comprehensive exercises including both review questions and carefully graded problems. The threefold purpose of these exercises is to ensure the review of text material which is so important to the learner, to stimulate independent thinking, and to develop ability to apply sound principles to the solution of difficult problems.

Chapter headings of the book are as follows: Perspective Elements; Oblique Lines and Planes; Parallel Perspective; Perspective Plan Method; Circles and Arcs; Reflections; Shades and Shadows in Perspective; and Perspective Auxiliaries. An index is provided.

Air Conditioning. By Herbert and Harold Herkimer. Published by Chemical Publishing Co., Inc., 26 Court St., Dept. FM, Brooklyn 2, N. Y. 720 pages. Illustrated. Cloth binding, board covers. Price, \$12.00.

The control of atmospheric conditions is of vital importance in a great many industrial fields. Over 200 different industries are mentioned in this book as a partial list of those in which the advantages of air conditioning have been recognized and used. The object of the book is to provide all the required information on every phase of air conditioning, including estimation, sales, promotion, installation, supervision, service, and so on. The book reviews the laws of chemistry and physics associated with air conditioning and then discusses the practical aspects of the industry, such as equipment, materials, and costs.

The subject matter has been carefully selected to provide well-balanced and systematic training to students of air conditioning engineering and to help engineers and other technical men to solve their problems in designing and repairing equipment, selecting materials, and estimating costs. The book is replete with problems and their solutions, tables, and illustrations.

You'll Break Records!



with your production
assemblies when you
use

DETROIT POWER SCREWDRIVERS

You can drive screws at the amazing speed of one a second, effect a big saving in time and labor, and reduce costs substantially

with these modern hopper-fed machines. 3 models to drive screws from No. 2 to 3/4" diameter. Will not mar heads or strip threads. All screws driven to uniform tension.

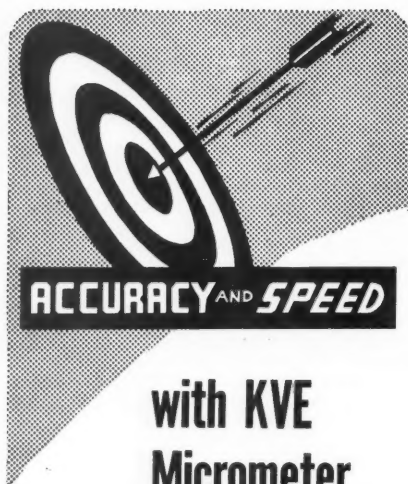
SEND SAMPLE ASSEMBLIES FOR ESTIMATE AND FREE CATALOG.

DETROIT POWER SCREWDRIVER CO.

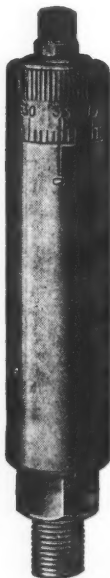


**MODEL
"B"**

**2807 West Fort Street,
Detroit 16, • Michigan.**



with KVE Micrometer Stop . . .



The accuracy and speed of the *KVE Micrometer Stop* saves you time and material in making screw machine stock stop adjustments. Pays for itself in a single run!

Perfect measurement of stock lengths permits accurate adjustment after running only ONE piece!

Adaptable to all automatic and hand screw machines. Shank diameters: $\frac{7}{8}$, $\frac{3}{4}$, and 1 inch.

Only \$5.00, postpaid.

Start cutting costs — order by mail today!
Write Dept. B.

Keene Valley
ENGINEERING CO.
Homer, N. Y.

The contents of "Air Conditioning" are arranged as follows: Gas Laws; Physical and Chemical States of Matter; Change of State; Heat Transfer; Heat Transmission of Building Materials; Heat Transmission Factors in Cooling; Radiant Heating; Elementary Thermodynamics; Water Vapor Mixtures; Dynamics; Elements of Health and Comfort; Fans, Ducts and Air Distribution; Heating Load; Cooling Load; Dehumidification; Spray Systems and Cooling Towers; Drying Systems; Cooling Methods and Refrigeration; Unit Air Conditioners; Central Systems; Auditorium Cooling and By-Pass System; Industrial Air Conditioning Summary; Automatic Controls; Estimating Costs; Appendix; Abbreviations; Symbols; and Conversion Table.

Work and Effort. By Thomas Arthur Ryan. Published by The Ronald Press Co., 15 E. 26th St., New York 10, N. Y. 323 pages. Illustrated. Cloth binding, board covers. Price, \$4.50.

This book provides a systematic survey of psychological investigations concerned with the productivity of men and women at work. It attempts to present an evaluated account of the knowledge that has been accumulating for many years, to provide a survey of current progress in this field of investigation, and to put the reader in a position to realize the need for future development in researches of this character.

Among the problems treated are training and learning, the control of accidents, establishment of pay levels for various jobs, and design of efficient methods of work. Motivation of the worker is considered in its relation to problems of efficiency. The book presents conclusions drawn from research in various fields. These include a study of the factors of light, heat, and ventilation, the control of monotony and fatigue, and the provision of conditions that make for maximum output without excessive effort or fatigue.

In addition to presenting material basically related to the topics mentioned above, the book also aims to acquaint the reader with the methods of research that led to the findings set forth so as to enable the reader to determine for himself just how the psychologist arrives at any given conclusion.

Please mention MODERN MACHINE SHOP when writing to advertisers.

New Shop Literature

Hannifin Double-Acting Hydraulic Cylinders are featured in a 52-page illustrated bulletin announced by the Hannifin Corp., 1101 S. Kilbourn St., Chicago 24, Ill. Planned primarily to provide a complete source of information and data for design engineers, the booklet also contains material of value to engineers in charge of the installation, operation, and maintenance of hydraulic power equipment.

An interesting feature of the bulletin is a presentation of 11 standardized mounting styles which can be used in a variety of combinations to solve practically any power application problem without involving special designing and construction. The use of differential hydraulic circuits as a means of providing for a fast return stroke in cylinder operation is also discussed and illustrated, with an explanation presented regarding the function of hydraulic cushions.

In the reference data section of the bulletin, formulas and data are provided for solving hydraulic cylinder problems involving piston diameters, pressure, pump delivery, piston velocity, and input horsepower requirements, together with

a discussion of pressure drops in piping, pipe sizes, and fluid velocity in pipes. As an overall guide to the proper selection of hydraulic cylinders, a check list is also included covering the points that should be considered in specifying cylinders and designing installations.

Copy of Bulletin 110 is available free to individuals engaged in work involving the use of hydraulic cylinder equipment.

Harper Computer of Corrosion Resistance. For determining the corrosion resistance of non-ferrous and stainless steel alloys, The H. M. Harper Co., 2620 Fletcher St., Chicago 18, Ill., is now offering an easy-to-operate slide rule type computer. Based upon exhaustive tests made by one of the foremost metal men in the country, the device classifies the resistance of 13 non-ferrous and stainless steel alloys in 142 corrosive applications with degrees of excellent, good, fair, and no good. Copious footnotes broaden its scope of applications to include most of the common uses of the alloys and many unusual ones.

The Harper Computer is offered free to mechanical executives addressing requests on their company letterheads.



Plunger moves away from, instead of against the lever, protecting delicate parts from sudden or excessive jolts. Each graduation on scale represents 1/1000" movement of plunger. \$6.50.

Positive - Lock SURFACE GAGE

Drawbolt has positive lock to prevent slippage. Spindle: 9" x 5/16". Block: 3 1/4" x 2 1/2" x 1" with 90° angle groove in base. \$6.00.

Dealers wanted to sell these tools. If no dealer write for circulars on the Koch Test Indicator and the new toolmaker's surface gage.

ANDREW GENALES

28 SECOND AVENUE, NYACK, N. Y.
Tel. NYack 2222

KOCH Test Indicator

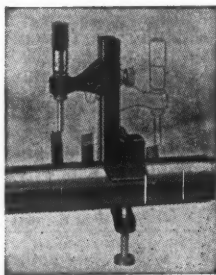
Two working ends—one to test outside surfaces, the other inside. For precision work and toolmakers' use.



Cleveland Model E Lead Screw Tapping Machine. The various construction features and operating advantages provided by the Cleveland Model E Lead Screw Tapping Machine are illustrated and described in a 12-page bulletin now being distributed by The Cleveland Tapping Machine Co., Hartville, Ohio. Illustrations and specifications of the six sizes in which the machine is available are also contained in the bulletin, in addition to illustrations and descriptions of modern feed devices which can be installed on all sizes of the tapping machine. Copy free upon request.

SAVE TIME

With
**Bartelt
Gages**



• Use a Bartelt Pedestal Micrometer for setting boring tools and for many other shop operations requiring accurate positioning relative to a fixed base. Make settings in one step—eliminate cut-and-try methods. Model B, with reversible slide, shown. Write for literature describing all models.

BARTELT ENGINEERING CO.

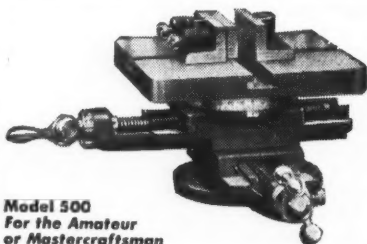
1216 PARTRIDGE AVE.

BELoit

• WISCONSIN

Motch & Merryweather Triple - Cut Method. The Motch & Merryweather Machinery Co., Penton Bldg., Cleveland 13, Ohio, now has available a 16-page three-color catalog relative to the Triple-Cut Method employed in the construction of M & M sawing machines, saw blades, and blade sharpeners. The catalog contains illustrations, descriptions, and specifications of the line of circular sawing machines offered by the company, including automatic units, standard units, and general purpose units. Information is also presented on an automatic machine for performing simultaneous circular sawing and double-end chamfering, drilling, threading, and centering operations, and on a special saw milling machine. In addition, illustrations and descriptions are presented on saw blades and blade sharpeners. The latter few pages of the catalog are devoted to case histories of the circular sawing of various metals by the Motch & Merryweather Triple-Chip Method. Copy free upon request.

Pratt & Whitney-Keller Type BG Tracer-Controlled Milling Machine. Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn., now has available a 16-page circular which fully illustrates, describes, and presents complete specifications on the several sizes of Pratt & Whitney-Keller Type BG Tracer-Controlled Milling Machine for use in the production of blanking punches, dies, and strippers; forming punches, dies, and draw rings; forging and trimming dies; stamping punches and dies; extrusion dies; die-casting dies; plastic molds; cores, and forces; permanent molds; metal core boxes and patterns; cams and template gages; experimental parts; pilot model components; and so on, as well as for profile and contour milling and the precision machining of irregular surfaces. Copy of Circular No. 495 free upon request.



Model 500
For the Amateur
or Mastercraftsman

MASTERCRAFT ROTARY TABLES

The Mastercraft Drill Press and Milling Table conforms to the exacting standards of best machine tool construction. A great time saver. Cuts keyways, special shapes, splines and innumerable other forms, and drills on a dead straight line or on a radius.

Write for circulars describing this model and 600, 700 and 800 Series for heavier work.

F & M SALES, INC.

1054 CANUENGA BLVD.

HOLLYWOOD 38

• CALIFORNIA

Geometric Improved Style DS Convertible Self-Opening Die Head for use on Brown & Sharpe and other single spindle automatics, as well as for use on hand machines, is fully covered in a 12-page bulletin issued by The Geometric Tool Co., New Haven 15, Conn. The bulletin discusses the features, application, setting up, and specifications of the die head, which can be used in four different applications; namely, pull-off for automatics, outside trip for automatics, pull-off trip for hand machines, and outside trip for hand machines. Copy of Bulletin DS-3 free upon request.

"Quality Stampings" is the title of a four-page illustrated bulletin published by the Federal Tool & Manufacturing Co., 3212 N. Washington Ave., Minneapolis 12, Minn., which discusses the facilities of the firm for blanking, piercing, forming, drawing, extruding, stenciling, drilling, tapping, and so on, in the production of stampings. Blueprints of typical stampings which can be produced by the company, including their cost, are presented in the bulletin, copy of which is available free by requesting Bulletin 101.

Air-Hydraulic Presses. Air-Hydraulics, Inc., 401 Broadway, New York 13, N. Y., announces a 12-page two-color bulletin illustrating various types of air-hydraulic presses, their accessories and uses. The center spread of the bulletin includes pictures of 28 jobs actually performed on the presses. Tables list the various models available, together with specifications. Copy free upon request.

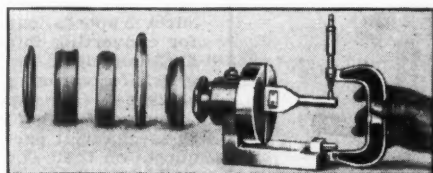
Nupla Mallets. The Acme Tool Co., 69 W. Broadway, New York 7, N. Y., now has available a bulletin illustrating, describing, and presenting complete tabular information, including prices, on interchangeable tip mallets which are furnished in soft, medium, and tough grades. Copy free upon request.

Acme Precision-Built Bench Vises. A four-page bulletin published by the Acme Tool Co., 69 W. Broadway, New York 7, N. Y., presents illustrations, descriptions, and complete tabular data, including prices, on a variety of precision-built bench vises. Copy free upon request.

TALLMAN

RADIUS EMERY WHEEL DRESSER

Concave radii
dressed up
to 2 1/2"



Convex radii
dressed up
to 1 3/8"

To dress a .250" concave radius raise diamond holder .250" above center. Lower diamond holder .250" below center for .250" convex radius. Pass diamond across face of wheel by rotating spindle with hand wheel, running wheel away from spindle.

An inexpensive dresser for precision performance.

Write for folder.

ALSO MANUFACTURERS OF CLAMPING BLOCKS AND DRILLING PLATES.

TALLMAN TOOL & MACHINE CORP., ROCHESTER, N. Y.

"Grits and Grinds," Vol. 38, No. 9. This issue of the technical house organ published monthly by the Norton Co., Worcester 6, Mass., presents the last of a series of eight articles by Dr. L. P. Tarasov on the detection, causes, and prevention of injury in ground surfaces. In addition, the booklet contains other informative articles entitled "Maximum Pressure Blasting Production with Norbide Nozzles," "Resin Bonded Coated Abrasives for Wet and Dry Grinding," and "A Cause of Wheel Breakage—Flange Distortion."

Copies of "Grits and Grinds" Vol. 38, No. 9 is available free upon request.

GAGES AT 70% SAVING

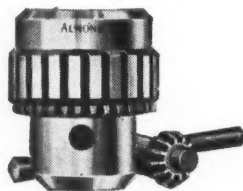
Brand new thread gages — ring and plug; majority Pratt & Whitney and Sheffield Corp. Also new plain plug gages; majority chrome plated, Lincoln Park and Vinco Corp., complete with handles. All sizes to 1½". 50% off prewar price list. Write for stock list.

PENJASKA TOOL CO.

OWOSSO

MICHIGAN

ALMOND DRILL CHUCKS



**Maximum Gripping Power with
Extreme Accuracy and
Long Life.**

Write for Catalog.

T. R. Almond Mfg. Co.
Ashburnham, Mass.
U. S. A.

"Recommendations for Carbide Milling." As a guide toward efficient carbide milling practice, viewed especially from the standpoint of cost analysis, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio, has prepared a 20-page booklet entitled "Recommendations for Carbide Milling." The material contained in the booklet presents a revision of former practices and supersedes earlier publications of the company on the subject. Into these new recommendations have been incorporated the latest findings that contribute to the knowledge of the field, including revised speed and cutter angle recommendations and an expanded section on the carbide milling of cast iron. The booklet reports on actual practice in the company's shop coupled with the finding of the Mill's Research Department.

Copy of Publication No. M-1614 is available free to mechanical executives addressing requests on their company letterheads.

Cutting Tools and Engineering Data. The Wetmore Reamer Co., 418 N. 27th St., Milwaukee 8, Wis., now has available a 64-page catalog which presents illustrations, descriptions, and tables relative to various types of reamers, arbors, sleeves, end mills, adjustable blades, boring bars and bits, special milling cutters, special tools, special boring bars, and other items. Moreover, the catalog contains a table of decimal equivalents, table of tapers, tungsten carbide comparison chart, hardness testing table, table of surface speeds, cutting speed table, table for converting minutes of a degree into decimals of a degree, table of reamer grinds for various materials, and data for solving reaming problems.

Copy of Catalog No. 48 is available free to mechanical executives addressing requests on their company letterheads.

GEARS

GOOD GEARS ONLY

All Kinds—Any Quantity

AT THE RIGHT PRICE

THE CINCINNATI GEAR CO.
Weester Pike Cincinnati, Ohio

Crosman's "T" Surface Grinder for production and odd job grinding and available with either bench or floor mountings is illustrated and described as to outstanding design features, operating advantages, applications, and specifications in a six-page pocket-size folder prepared by J. B. Crosman & Son., Inc., East Walpole, Mass. Copy free upon request.

Jakobsen Tool Bench Grinder. The Jakobsen Tool Co., 224 Glenwood Ave., Bloomfield, Zone 3, N. J., is now distributing a four-page circular which illustrates and describes a bench grinder for use in the production of small dies, formed tools, flat drills, and other items of high speed steel or carbide. Copy free.

"Safety on All Sides" is the title of a four-page folder illustrating and describing D & M Automatic Punch Press Guards which is now being distributed by Taylor-Shantz, Inc., 2 Commercial St., Rochester 4, N. Y. Several typical installations of the guards are illustrated. Copy free upon request.

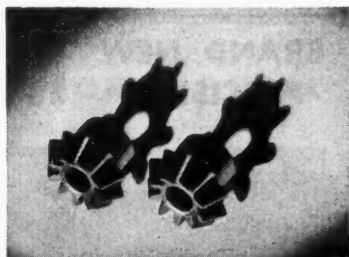
Brown & Sharpe Electronic Measuring Equipment, which is designed to provide a dependable means for taking external and internal measurements electronically with a degree of accuracy and ease that aid in accurate manufacture and size control, is illustrated and described in a 16-page catalog published by the Brown & Sharpe Manufacturing Co., Providence 1, R. I. The equipment comprises an amplifier and external comparator, both of which are fully pictured and discussed, as well as various attachments for use with the equipment, including an internal comparator attachment, gage head cartridge, and signal light attachment. Copy free upon request.

Porter-Cable Type L-4 Centerless Belt Grinder. A comprehensive explanation of the centerless belt grinding method is presented in a four-page folder issued by the Porter-Cable Machine Co., 300-10 Wolf St., Syracuse 8, N. Y. The benefits to be derived from the centerless belt grinding method are fully discussed and illustrated. Complete specifications of the Porter-Cable Type L-4 Centerless Belt Grinder are given. Copy free upon request.

Need **FINE PITCH
BEVEL GEARS?**

Experience and skill are heavy factors in correctly producing fine pitch straight bevel gears. Teeth with proper bearing—minimum runout—accuracy of form and bevel—all of these involve special experience which Beaver Gear Engineers have gained in developing straight bevels up to 64 D.P., and finer in some cases. Highly specialized production methods and inspection equipment insure gears made to exact specifications.

For assistance with your problems on straight bevel gears, write or phone us for recommendations. No obligation of course.



1022 PARMELE STREET

• ROCKFORD, ILLINOIS

Write for latest bulletin describing Beaver Gear Facilities and Methods.

Cone-Drive Fan-Cooled Speed Reducers. A four-page technical data sheet describing the operation of its fan-cooled speed reducers has been made available by the Cone-Drive Division, Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. The bulletin illustrates the manner in which standard Cone-Drive HU speed reducers can be converted to fan cooling in the field by the simple addition of a fan and stamped air-flow control shields. Tables listing combined mechanical and thermal ratings, plus detailed information required when ordering reducers, are provided. Copy of Data Sheet 8974 free upon request.

Corlett-Turner G3 Grinder, a ruggedly constructed, versatile, precision-built unit for small tool grinding and also adaptable for deburring, buffing, polishing, and numerous other special applications, is illustrated and described in a four-page circular released by the Corlett-Turner Co., 1001 S. Kostner Ave., Chicago 24, Ill. Numerous applications of the unit are shown. In addition, the circular contains a separate price list of the grinder. Copy free upon request.

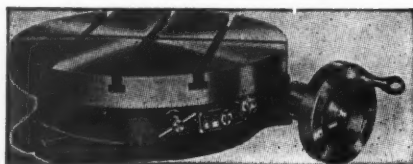
"Bulldog" Toolholders. The R & D Toolholder Corp., 62 Ryle Ave., Paterson 2, N. J., has prepared a six-page bulletin which presents illustrated, descriptive, and tabular information on lathe turning toolholders, lathe cut-off toolholders, and turret lathe cut-off toolholders. Copy of Bulletin No. 62 free upon request.

Heald Models 222 and 322 Bore-Matic Precision Finishing Machines for both rough and finish boring, turning, facing, chamfering, grooving, or fly cutting are fully described and illustrated in a four-page bulletin released by The Heald Machine Co., Worcester 6, Mass. A table of specifications is included in the bulletin, copy of which is available free.

Pratt & Whitney-Keller Type BG Tracer-Controlled Milling Machine, product of Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn., is illustrated and briefly described in a four-page circular issued by this firm. Complete specifications of the unit are included. Copy of Circular No. 501 free upon request.

BRAND NEW PRECISION

ROTARY TABLES



| | |
|-----|-------------------------|
| 9" | \$ 97.00 |
| 12" | 160.00 |
| 15" | 185.00 |
| 18" | 220.00 |
| 18" | 350.00 Extra Heavy Duty |
| 21" | 500.00 Extra Heavy Duty |
| 25" | 590.00 Extra Heavy Duty |

OUR ROTARY TABLE WILL TAKE THE PLACE OF A COSTLY FIXTURE. IT IS USED FOR ALL KINDS OF WORK ON MILLING MACHINES, SHAPERS, DRILL PRESSES AND HORIZONTAL BORING MILLS.

IN STOCK

Special Thread Taps &
Dies. Left Hand Taps &
Dies. Plug & Ring
Thread Gages. Drills,
Reamers, Milling Cut-
ters, End Mills, Etc.

WE CAN ALSO FURNISH DIVIDING ATTACHMENTS.

Send for Literature and Details.

IMMEDIATE DELIVERY

Send For
200 Page
Catalog

LAFAYETTE TOOL & SUPPLY CO.

128 LAFAYETTE STREET

NEW YORK 13, N. Y.

Berkeley Power Drive, product of The Danville Tool Corp., 1015 Maple Ave., Danville, Ill., is the subject of an eight-page bulletin prepared by this firm. The bulletin illustrates and describes various designs of the drive and their applications to lathes, screw machines, grinders, drill presses, shapers, milling machines, and other machine tools. Copy free.

Man-Au-Trol Model 30H Horizontal Lathe, designed primarily for between-center work on shafts and chucking jobs where turning, grooving, facing, and angle turning operations are required, is covered as to specifications, features, uses, and so on, in an eight-page catalog now available free from The Bullard Co., Bridgeport 2, Connecticut.

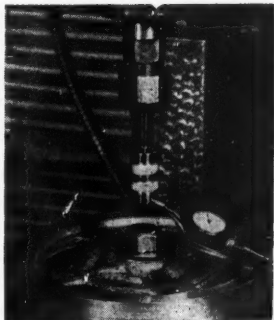
"A Primer on Precision" is the title of a plastic-bound catalog prepared by Veit & Young, Huntingdon Valley, Pa., which profusely illustrates and describes the facilities of this firm for designing and producing precision dies, tools, and special machinery. Copy free to mechanical executives upon request.

Cincinnati "Projecto-Form" Grinding Machine for the optical projection grinding of small profile shapes such as those required by formed carbide cutter tips, lamination dies, and so on, is fully illustrated and described in a 12-page catalog published by The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. Dimensional drawings of the unit and a table of general specifications, as well as illustrations and descriptions of extra equipment available for the machine, are included in the catalog. Copy of Publication No. M-1612 free upon request.

Porter-Cable C-6 Belt Grinder-Polisher, is the subject of an eight-page two-color bulletin announced by the Porter-Cable Machine Co., 300-10 Wolf St., Syracuse 8, N. Y. The bulletin explains the principles of contour grinding and lists the benefits to be derived from this method of polishing contoured pieces of work on an especially shaped wheel. Various models of the C-6 grinder-polisher are shown, with complete specifications presented for each model. The bulletin is also illustrated with in-action photographs of the machine performing a variety of jobs. Copy of Bulletin No. 660 free upon request.

PHILLIPS UNIVERSAL INDICATOR HOLDER

For use in jig borers, vertical and horizontal milling machines, horizontal boring mills; drill presses and lathes.

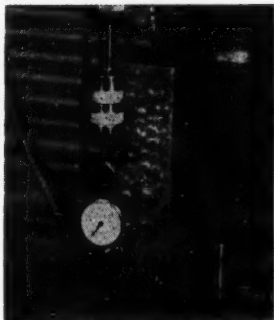


Arrangement for Large Diameters.

Produced for the following indicators:

- Last Word Model F
- Gem
- Federal
- Ideal
- Gladwin

Holder has $\frac{3}{8}$ inch diameter shank with tapped hole in end for extension.



Arrangement for Small Diameters.

MANUFACTURED BY

PHILLIPS BROS. SCREW PRODUCTS CO.
125 S. HOWARD AVENUE LANSING 12, MICHIGAN

"Heat for Metals," a 32-page two-color booklet published by the Surface Combustion Corp., Toledo 1, Ohio, is descriptive of the company's broad activities in metallurgical research and in the designing and manufacturing of heating equipment for the metal producing and working industries. Subjects covered include the latest developments in heating equipment for steel mills; the history of the development of gas chemistry and heat treatment; prepared gas atmospheres and heating equipment applications to processing such as gas carburizing, carbon restoration, atmosphere hardening, gas

normalizing and annealing, gas cyaniding, gas quenching, gas malleableizing, and atmosphere heating for forging. In addition, standard industrial furnaces and burner systems and equipment are described.

Copy of the booklet is available free to individuals addressing requests on their company letterheads.

60 YEARS MANUFACTURING

Multiple Spindle Drilling and Tapping Machines • Automatic Drilling and Tapping Units • Multiple Spindle Attachable Drill Heads • Hot and Cold Swaging Machines • Hammering Machines • Tools, Jigs and Fixtures • Contract Work • Special Machinery.

LANGELIER MANUFACTURING CO.

Providence 7, Rhode Island

CLEAR

NAMEPLATE MARKING

MODEL No. 4



The nameplate on your product is your signature; keeps it neat and legible! Accurate location and alignment are assured with this **NAMEPLATE DETAIL PRESS.**

- Simple Operation
- Perfect Alignment
- Uniform Depth

GEO. T. SCHMIDT, INC.



1806 W. BELLE PLAINE AVE.
CHICAGO • 13 • ILLINOIS

"Recommendations for Grinding Carbide Milling Cutters" is the title of a 16-page booklet published by The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. The following topics are covered in the booklet: carbide grinding department; storing and handling of cutters; marking of cutters; general equipment; general instructions; and specific recommendations for grinding a carbide-tipped face mill. A table of recommended primary clearance angles is also included in the booklet.

Copy of Booklet M - 1608 is available free to mechanical executives addressing requests on their company letterheads.

Shear-Speed Shapers. An eight-page technical bulletin describing its line of Shear-Speed Shapers and their uses has been issued by the Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. The bulletin shows how various splines, cams, sprockets, gears, clutches, ratchets, and miscellaneous external shapes may be rapidly produced on the machines. The bulletin also features a series of close-up action shots showing Shear-Speeds in use on a variety of jobs. Complete specifications for the four available models, together with descriptions of the coolant and lubrication systems, and so on, are included. Copy of Bulletin No. 1800-47 free upon request.

CAMS

Our ROWBOTTOM cam cutting facilities are at your disposal for your cam requirements.

Let us have your inquiries.

BLOOMFIELD TOOL CORP.

37 FARRAND ST. BLOOMFIELD, N. J.

"Modern Automatics," a 12-page catalog published by The New Britain Machine Co., New Britain-Gridley Machine Division, New Britain, Conn., presents illustrations, descriptions, and specifications on automatic screw machines, automatic chucking machines, precision boring machines, and automatic turret lathes. Copy free upon request.

Motch & Merryweather No. 2 Circular Sawing Machine, product of The Motch & Merryweather Machinery Co., Cleveland 13, Ohio, is the subject of a 12-page catalog prepared by this firm. Illustrations and descriptions of the standard and automatic models in which the machine is available, as well as of the outstanding features of the unit, are included in the catalog. Data on the sawing of various materials by the Triple-Chip Method are also presented.

In addition, the catalog contains an illustrated description of a blade sharpening machine, as well as tables of recommended saw blade speeds for the cutting of various metals. General specifications of all machines treated are presented in tabular form. Printed in three colors, the catalog is available free upon request.

Moore Pneumatic Comparator Gages. The Moore Products Co., H & Lycoming Sts., Philadelphia 24, Pa., has published a 24-page bulletin which presents complete information on all phases of air gaging. The bulletin contains economic and application data as well as information on the principles of operation, features, and calibrations for each of the three types of Moore Pneumatic Comparator Gages. Specification information shows standard clearances and wear allowances of the company's standard pneumatic members for measuring inside and outside diameters.

Copy of Bulletin 804 is available free to mechanical executives addressing requests on their company letterheads.

"Hallowell" Steel Platform Trucks provide the subject of a 12-page catalog published by the Standard Pressed Steel Co., Box 556, Jenkintown, Pa. The catalog presents illustrated, descriptive, and complete tabular information on a wide variety of non-tilting and tilting type steel platform trucks, as well as on steel wagon trucks, oiltight box trucks, noiseless type trucks, and special trucks. Copy of Catalog No. 624 free upon request.

MORE SPEED
MORE SUPPORT

MORE WORK

CUTS COST OF SAW-BLADE REPLACEMENTS

Paddock Ball-Bearing Band Saw Guides will more than pay for themselves in a very short time by (1) Saving on Blade Breakage, (2) Speeding up production, (3) Cutting any materials at any speed, and (4) Protecting workman. The whole secret of Paddock Efficiency: Interchangeable ball-bearing wheels running with the blade give strong yet friction-free support. Sold on ten days FREE TRIAL. They make any band-saw, old or new, work better!

PADDOCK TOOL COMPANY
1418 Walnut Street Kansas City 6, Missouri

Guide Makers Since 1920

Paddock

**BALL-BEARING
BAND SAW GUIDES**



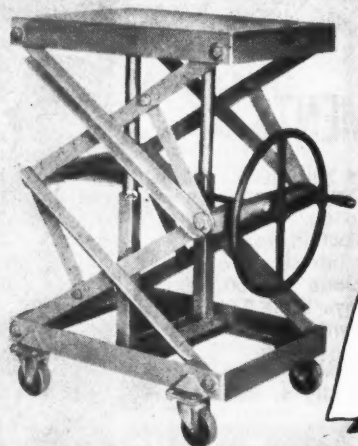
"You Can Read Correct Weight at a Glance" is the title of a six-page pocket-size folder published by the Warren-Knight Co., 136 N. 12th St., Philadelphia 7, Pa., which illustrates and describes the Wakco Weight Slide Rule for use by blacksmiths, estimators, stockkeepers, foundrymen, patternmakers, and other individuals in figuring the weights of metals quickly and accurately. Copy free upon request.

Allis-Chalmers "Pre-Engineered" Texrope Drives. A 144-page indexed catalog of "pre-engineered" stock Texrope drives which is designed to simplify the selection of proper drives for particular applications has been announced by the Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. Nearly two-thirds of the catalog is devoted exclusively to pre-engineered stock Texrope drives for all applications from 1 to 150 h.p. More than 22,000 stock drives are listed in this section. Drives for all horsepower, motor speeds, ratios, and driven speeds are systematically listed according to horsepower.

Copy of the catalog is available free to mechanical executives addressing requests on their company letterheads.

"Tops in Tapping" is the title of a 12-page catalog issued by The Charles L. Jarvis Co., Middletown, Conn., which describes the Jarvis-Dowding line of taps and dies. A foreword in the attractively printed maroon and black catalog explains that the acquisition of the Dowding Company by Jarvis rounds out the Jarvis line of Torqomatics, rotary files, and flexible shaft machines. The catalog lists complete specifications of all standard taps and dies in the Jarvis-Dowding line and provides a data sheet for ordering such equipment or for specifying requirements for specially designed and engineered taps and dies for unusual or difficult needs. Copy of Catalog JDT 1 free upon request.

Norton Cylindrical Grinders. The Norton Co., Worcester 6, Mass., now has available two attractively printed four-page catalogs presenting illustrations, descriptions, and specifications on cylindrical grinders. Catalog No. 157-1 is devoted to Norton 6-Inch Type CTU Cylindrical Grinders, while Catalog No. 166-1 deals with Norton 10-Inch Type CTU Cylindrical Grinders. Copy of either or both catalogs free upon request.



DI-LIFT TABLE "A"

SPECIFICATIONS

All-steel, move, lift and lower dies. Support over hanging work, portable work bench. Can be furnished with adjustable angle top.

Write for Free Folder "C"

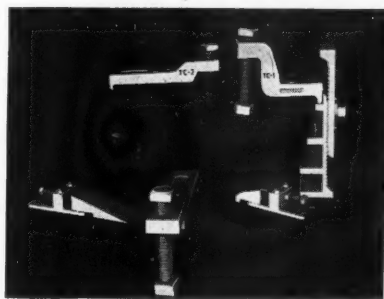
MONTGOMERY & COMPANY
53 PARK PLACE • NEW YORK 7, N. Y.

Hanchett Hermeti - Coil Magnetic Chucks and Accessories are the subject of an 18-page two-color bulletin published by the Hanchett Manufacturing Co., Big Rapids, Mich. The bulletin provides lists of sizes and prices of all Hanchett chucks and includes pictorial descriptions of how a magnetic chuck is assembled and examples of work applications, as well as a section devoted to accessories for use with magnetic chucks. Copy of Bulletin O47-1 free upon request.

Motch & Merryweather No. 00 Circular Sawing Machine for cutting $\frac{1}{4}$ to 2-inch stock is illustrated and described in a 12-page catalog published by The Motch & Merryweather Machinery Co., Penton Bldg., Cleveland 13, Ohio. Printed in three colors, the catalog provides data on the construction features, advantages, and applications of the automatic, semi-automatic, power feed, and hand-operated models in which the machine is available. Similar data are also provided in an automatic saw grinding machine and larger type circular sawing machines for 6, 10, and 16-inch diameter work. Copy free upon request.

Schmiege "Centri-Merge" Swirl Type Dust and Fume Eliminators, applicable to practically every industrial use where dust is a menace to operation, from sand handling to grinding, buffing, boring, and polishing operations, and so on, as well as the removal of acid fumes, are featured in a 12-page folder published by Schmiege Industries, Inc., 314 Piquette Ave., Detroit 2, Mich. The folder includes sectional views of the eliminators showing their construction features and principle of operation. In addition, the folder contains blueprints giving complete dimensions of the various sizes in which the dust and fume eliminators are available. Copy free upon request.

Standard Cerro Alloys Physical Data. The Cerro de Pasco Copper Corp., Dept. 10, 40 Wall St., New York 5, N. Y., now has available a chart which lists complete data regarding the properties of the standard alloys offered by the company, including Cerro-Base, Cerro-Bend, Cerro-Low (117, 136, and 147), Cerro-Matrix, Cerro-Safe, and Cerro-Tru. Copy free upon request.



**ILLUSTRATION SHOWS
TYPICAL USES**

JOBBER TERRITORIES AVAILABLE

Send for
Descriptive
Material

QUICK---SAVE TIME!

**NOW—THESE NEW BRIDGEPORT
ADJUSTABLE TABLE CLAMPS
and the
ADJUSTABLE LADDER BLOCK**

Exclusive Features:

- Safe—Strong—Sure—Quick
- Eliminates unsteady blocks
- Tested 100,000 lbs. P.S.I.
- Fast setups—Save labor
- Solves clamp bottleneck
- Positive clamp security
- Adjustable for height
- Special alloy bronze

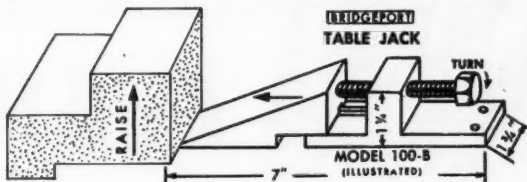
HARDWARE SALES CO., • 1969 North Ave., Bridgeport, Conn.

**THE ONLY JACK THAT
STARTS FROM ZERO**

Time Saving Setups • Eliminates
Guess Work • Eliminates Shims

MADE IN 3 SIZES

- Model 100-A—Lift to 500 lbs.
- Model 100-B—Lift to 4000 lbs.
- Model 100-C—Lift over 4000 lbs.



"The Miller That Uses Its Head" is the title of a four-page folder prepared by the Nichols-Morris Corp., 50 Church St., New York 7, N. Y., which illustrates and describes its line of hand millers for speed and accuracy in the milling of small and medium-sized parts. In addition to the standard lever feed machine, models covered include a toolroom and laboratory model; airfeed model for semi-automatic production at high speed; second operation model for precision turning, facing, boring, and recessing, as well as milling; and double-spindle models for high production applications where the simultaneous action of two cutter spindles is practical. Copy free upon request.

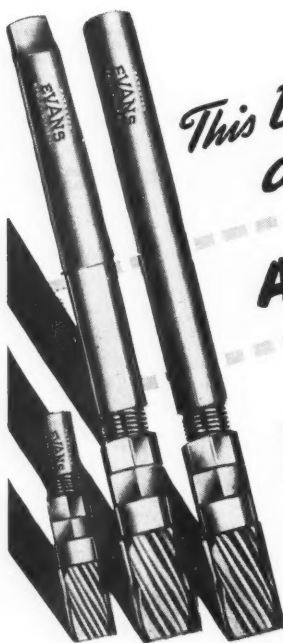
KHP Kaiser Aluminum. The Korhumel-Heffron & Preiss Steel Co., 6559 S. Lorel Ave., Chicago 38, Ill., now has available an attractive four-page folder which provides a complete stock list of its Kaiser Aluminum which is available in flat and coiled sheet in all standard warehouse sizes, commercial grades, and alloys. Copy free upon request.

"Bayflex" Raised Hub Disc Wheels.

The Bay State Abrasive Products Co., Westboro, Mass., announces a folder and price list on its "Bayflex" Raised Hub Disc Wheels. The three-color four-page folder provides a complete detailed and pictorial description of the wheels, their wide variety of uses, and their many outstanding advantages. The folder contains insert pages which provide complete tables of discounts, standard ordering quantities, and list prices. Copy free.

"Grits and Grinds" Vol. 38, No. 10. This edition of the monthly house organ published by the Norton Co., Worcester 6, Mass., is devoted primarily to an illustrated article entitled "Precision Tumbling of Metal Parts" by R. M. Lord, Norton grinding engineer. Topics covered include advantages, grit sizes, untumbled abrasive, abrasive tumbling applications, tumbling equipment, size of abrasive to use, amount of abrasive to use, cleaners and compounds, and so on.

Copy of "Grits and Grinds" Vol. 38, No. 10 free upon request.



This EVANS adjustable
CHUCKING REAMER
ASKS NO FAVORS

It takes tough jobs in stride . . . improves upon the performance of any standard reamer without changing set-up. Spiral blades ream a smooth finish in one operation, even when finishing holes with keyways, slots or grooves. Straight line expansion prevents springing or stressing of blades—allows use of full expansion range. Wear is evenly distributed . . . operation is smoother and faster...blades last longer. Write today for full information and prices.

EVANS REAMER AND MACHINE CO.
New Lexington, Ohio

Wear and Surface Finish. By E. L. Hemingway. Published by Gisholt Machine Co., Madison 3, Wis. 80 pages. Illustrated. Heavy treated paper covers.

This book covers the basic reasons for surface wear and its relation to surface finishing. Both the measurement of surface roughness and its correction by Superfinishing are discussed. The controversial subject of when to use a scratch pattern and when to use an ultra-smooth finish is dealt with in detail. Fully one-third of the book is devoted to large and clear illustrations.

The author is a metallurgist and for

the past 10 years has been prominently occupied in research on the subject of wear and surface finish. Copies of the book are being offered to mechanical executives free upon request.

"The Hole Story," a six-page folder published by The Carlton Machine Tool Co., Cincinnati 25, Ohio, contains illustrations, descriptions, and tabular data on the Carlton Low-Hung Drive 4-A Radial for drilling, tapping, and boring operations. Copy free upon request.

DO TURRET LATHE JOBS

on your 9" to 16" engine and bench lathes with ENCO Self Indexing Hexturrets.

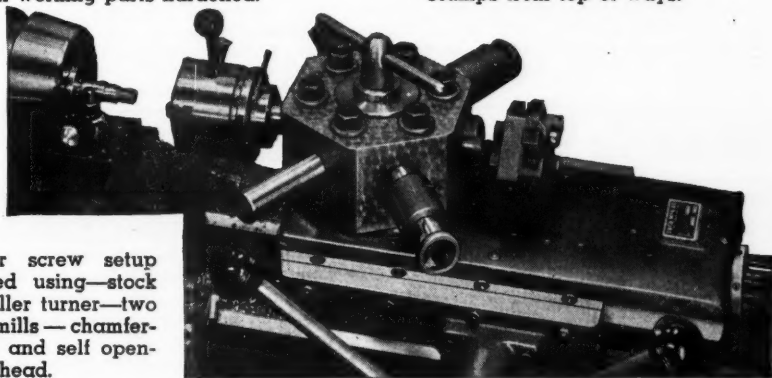
ACCURATELY

AND

QUICKLY

Double gibs.
Double drive gears and racks.
Ground and spotted slide ways.
All working parts hardened.

Smooth and sensitive control
with pilot wheel drive.
Easy stop screw adjustment.
Clamps from top of ways.



Shoulder screw setup illustrated using—stock stop—roller turner—two hollow mills—chamfering tool and self opening die head.

| | |
|---|--|
| Model 425 1" tool holes 4 1/4" stroke Price \$275.00 | Model 425 available for Atlas, Logan, Clausing, South Bend 9" and 10", Sheldon 10", 11" and 12", Craftsman 12", Power Kraft 10" and Sebastian 12". Delivery 2 weeks. |
| Model 651 1" tool holes 6 1/2" stroke Price \$350.00 | Model 651 for all above lathes except South Bend 9". Delivery 2 weeks. |
| Model 650 1 1/4" tool holes 6 1/2" stroke \$400.00 to \$475.00 | Model 650 for South Bend 13", 14 1/2" and 16", Regal 13", 15" and 17" and Sebastian 14" and 16". Delivery 2 to 6 weeks. |

We can furnish an Enco Hexturret for most all bench or engine lathes with from 9" to 16" swing. Write for catalog and quotation.

ENCO MANUFACTURING COMPANY
DEPT. 11, 4522-24 W. FULLERTON AVE., CHICAGO 39, ILL.

Fellows Rotary Gear Shaper for the production cutting of external and internal spur and helical gears is described and illustrated in a four-page folder prepared by The Fellows Gear Shaper Co., Springfield, Vt. Illustrations show typical jobs which can be handled by the machine. Copy free upon request.

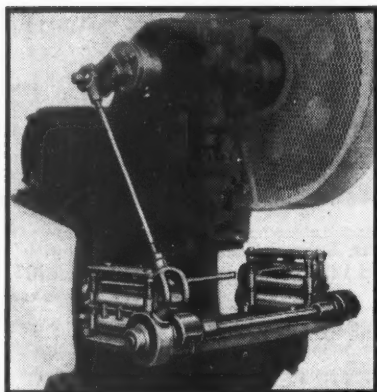
"Like Radar, Kardex Signals Exceptional Facts" is the title of a six-page four-color presentation prepared by Remington Rand Inc., which is designed to provide executives a clear picture of the ease with which the tested, time and error-saving principle of management-by-exception can be applied to the control of sales, stocks, personnel, and collections, with important gains in work simplification and record cost reduction. The publication outlines the significance of signal control as a tool of management for graphic presentation of action-facts that must be known if losses are to be avoided and opportunities capitalized.

Copy of the presentation is available by requesting KD-361 from the Systems & Methods Research Dept., Remington Rand Inc., 315 Fourth Ave., New York 10, New York.

Handbook on Hydraulic Oils. A 48-page handbook published by E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa., provides a practical, easy-to-read reference work for all users of hydraulic oils. Containing seven chapters, many tables, diagrams, and illustrations, the handbook completely covers specifications, importance of properties not included in the usual specifications, additives, and qualities which a good hydraulic oil must possess. The chapter on "Trouble Shooting," largely devoted to listing specific troubles and their remedies, should be of special interest to those charged with the proper maintenance of hydraulically operated mechanisms. Concluding chapters describe Houghton's fortified hydraulic oil, Hydro-Drive, and Houghton service. Copy free.

Onondaga Tool Catalog 103. The Onondaga Tool Corp., P. O. Box 187, Fayetteville, N. Y., has published a 16-page catalog which presents illustrated, descriptive, and tabular information on roughing taper reamers, helical finishing reamers, high speed taper pin reamers, and high speed boring bars. Copy of Catalog 103 free upon request.

Increase the efficiency of your punch presses with . . .



A La Bahn Double Roll Feed Installation

AUTOMATIC ROLL FEEDS

- Easily attached to any press.
- Completely automatic in operation.
- Presses produce 100% of operating time.
- Precision built for consistent and accurate feeding and long life.
- Simple design—easy to maintain.

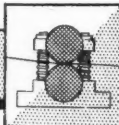
Standard models from 3" to 12" wide with up to 18" advance in both single and double feed models. Larger feeds and longer advances can be made to your specifications.

We also manufacture a complete line of Stock Reels, Stock Straighteners, Wire Straighteners and Scrap Cutters.

Write today for literature and quotation forms. La Bahn Machinery and Mfg. Company, 544 Lincoln Highway, Menlo Park, N. J.

LA BAHN

ROLL FEEDS • STOCK REELS



MACHINE & MFG. CO.

MENLO PARK • NEW JERSEY

STOCK STRAIGHTENERS • SCRAP CUTTERS

Carboloy General Tool Catalog GT-200.

A 65-page general tool and carbide parts catalog listing its standard cemented carbide products, together with specifications and prices, has been issued by the Carboloy Co., Inc., Detroit 32, Mich. Among the products covered in the catalog is the standard line of solid Carboloy boring bars, as well as the expanded line of solid Carboloy boring tools. Other products covered include solid unground Carboloy rod in stock in diameters ranging from $\frac{1}{8}$ to $\frac{1}{2}$ inch; solid carbide face mill blades ground on three sides ready to use, in two grades and three sizes; solid ground Carboloy balls, standard in Grade 44A and in 10 sizes from $\frac{1}{16}$ to 1 inch in diameter; solid carbide discs; discs with holes; solid carbide strips; standard case-hardened holder for use with Carboloy diamond impregnated wheel dressers; and carbide blanks for threading tools, listed as standard for five tool sizes ranging from $\frac{1}{8}$ to $\frac{1}{2}$ inch. Specifications and prices are given for the square and round standard carbide-tipped boring bars which are now carried in stock in seven standard styles.

An outstanding feature of the catalog is a 12-page section devoted to wear resistance applications. In these pages are

pictured approximately 100 typical applications of Carboloy cemented carbide in ceramics, textile, watchmaking, wire making, metal-working, and other industries. In this section, a new method of attaching large sections of carbide with studs, bolts, and so on, is also pictorially described.

Greatly enhancing the practical value of the catalog are small line sketches showing typical applications of standard carbide tools and suggested uses for various shapes of standard carbide blanks. Also included is a full page chart (published for the first time) showing at a glance where to use the various grades of Carboloy cemented carbide. Copy of Catalog GT-200 free to executives upon request.

"Kwik-Size" Boring Tools. A bulletin covering its general-purpose boring tools is now being distributed by the Kaukauna Machine Corp., Kaukauna, Wis. The bulletin illustrates a number of typical industrial boring applications and lists the performance of "Kwik-Size" Boring Tools through a comprehensive sequence of operations. Copy free upon request.

SPEED UP SMALL JOBS with "YANKEE" VISES

Line up small work just once in a "Yankee" Vise for a whole series of hand and machine operations. Four sizes ... 1½", 2", 2¾" and 4" jaw widths ... with and without swivel base. Hardened steel "V" block for round stock. Your industrial distributor has a full stock.

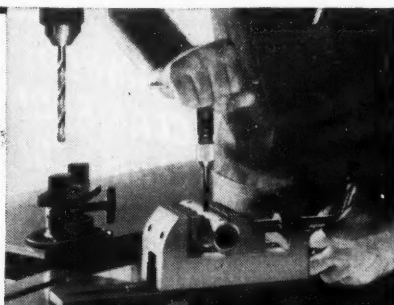
Write for The "YANKEE" Tool Book

"Yankee" Tools now part of



THE TOOL BOX OF THE WORLD

NORTH BROS. MFG. CO.
Philadelphia 33, Pa.



"Yankee" 1993 Vise, removed from swivel base and held by "Yankee" Vise Clamp for drilling and tapping.



Bench-mounted on quick-release swivel base.

Vise lifts on and off swivel base.

"A Cross Section of Work Performed on Natco Drilling, Boring, Facing and Tapping Machines for the Metal-Working Industry" is the title of a 68-page booklet published by the National Automatic Tool Co., Dept. 27, Richmond, Ind. The booklet presents 66 case histories of various parts actually machined on Natco equipment. A full page is devoted to each case history, which includes blueprints and a complete explanation of how work is accomplished, production, number of holes and operation, sizes of holes, limits, and material.

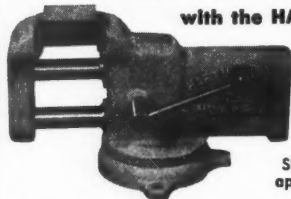
Spiral bound, the booklet is attractively printed in two colors and is alphabetically indexed for easy reference. Copy is available free to mechanical executives upon request.

Redhard Metals. An eight-page illustrated booklet prepared by Redhard Metals, Inc., N. York Rd., Hatboro, Pa., presents tabular information on the heat, wear, and corrosion-resisting properties, as well as dimensions and prices, of cutting tools and precision castings made of Redhard high temperature alloys. Copy free upon request.

**PUSH-LOCK-CLAMPED!
PUSH-LOCK-CLAMPED!
PUSH-LOCK-CLAMPED!**

No Twists . . . No Turns

with the HARTMANN



450

Shipping wt.
approx. 52 lbs.

A heavy-duty 4 1/2" bench vise on swivel base . . .
Saves time and energy. Mill and Tool Supply Dealers
now being established . . . Write Dept. MM.

INDUSTRIAL ENTERPRISES, Inc.

201 SIXTH STREET • RACINE WISCONSIN

Kodagraph Autopositive Paper, a silver-sensitized paper for reproducing engineering drawings, is described in an eight-page pamphlet issued by the Eastman Kodak Co., Industrial Photographic Division, 343 State St., Rochester 4, N. Y. The pamphlet discusses the use of the paper for such jobs as reproducing opaque drawings, worn, stained or discolored tracings, and direct process prints or blueprints. Copy free upon request.

Hi-Lo Automatic Pulley, a device which is designed to provide infinite variable speed with constant speed motors and standard V-belts, is fully illustrated and described in a four-page catalog now being distributed by the Equipment Engineering Co., 2853 Columbus Ave. S., Minneapolis 7, Minn. Complete engineering data on the pulley, as well as list prices on pulleys and bases, are included in the catalog, copy of which is available free upon request.

"Precision Tap Sharpening on the Blake Flute Grinder" is the subject of an eight-page illustrated report prepared by the Edward Blake Co., 634 Commonwealth Ave., Newton Centre 59, Mass., and based upon considerable data provided by Stanley W. Lovejoy of the General Electric West Lynn Works. Copy free.

Hercules Retainers and Interchangeable Punches. Whitman & Barnes, Detroit 16, Mich., announces the publication of a new edition of its catalog covering Hercules Retainers and Interchangeable Punches. Designated as the No. 99, the catalog is available free to individuals addressing requests on their company letterheads.

ADVANCE CLAMPS

**Cut Set-Up Time 75 %
on**

JIGBORERS

THE ONLY T-SLOT CLAMP

For use on all machines with T-slots.

Manufactured and sold by

ADVANCE MACHINE WORKS

FORT WAYNE 7, INDIANA

Severance Midget Mills. A 12-page bulletin covering its midget mills, junior mills, laboratory mills, carbide midget mills, die mills, fin mills, and micro-mills is now being distributed by Severance Tool Industries Inc., 724 Iowa St., Saginaw, Mich. Compiled to embrace in one handy reference the products of the midget mill group, the bulletin also lists ground carbide hand files and ground carbide die machine files. In addition, it contains data on the various patterns of cut, tooth characteristics, and pitches of teeth, and provides information on a complete re-grinding service. Copy of Bulletin 16-M free upon request.

Pratt & Whitney No. 2C All-Electric Jig Grinder, a complete machine tool for the precision locating and grinding of holes in normal or hardened master plates, gages, jigs, dies, and small-lot production parts, is fully illustrated and described in an eight-page circular released by Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn. Specifications of the unit are included. Copy of Circular No. 500 free upon request.

Alligator Wide Belt Cutter for cutting all belts (excepting those containing metal) up to 60 inches wide x 1½ inches thick is illustrated and described in a bulletin published by the Flexible Steel Lacing Co., 4607 Lexington St., Chicago 44, Ill. List prices of the various sizes in which the cutter is available, as well as of cutter parts, are included in the bulletin. Copy of Bulletin No. BC-350 free.

Pratt & Whitney 26-Inch Hydraulic Vertical Gear Grinder for spur and helical gears is fully covered as to construction details, operating advantages, applications, and specifications in an eight-page illustrated circular prepared by Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn. Copy of Circular No. 496 free upon request.

Heald Model 2 Tool Sharpening Machine, a product of The Heald Machine Co., Worcester 6, Mass., is covered as to features, advantages, and specifications in a four-page bulletin published by this firm. Copy of Machine Bulletin No. 4-2-1 free upon request.



Specials!

CIRCULAR AND FLAT FORM TOOLS FOR *all* BAR MACHINES

Stites' Personalized Screw Machine Tool Service for Cams and Tools has now been broadened to include the manufacture of circular and flat form tools for all bar machines. Combined know-how and accuracy built into every tool.

Circular and flat form tools illustrated typify our diversified engineering and manufacturing facilities for Acme, Cleveland, Davenport, Brown & Sharpe No. 00 and No. 6, and Warner & Swasey Machines. Delivers to meet individual customer requirements.



THE STITES TOOL CO.

1426 W. 3rd St.
Cleveland 13, O.

Carboloy Wheel Dressers. A uniquely illustrated 18-page booklet describing its line of diamond impregnated cemented carbide grinding wheel dressers has been made available by the Carboloy Co., 11143 E. Eight Mile St., Detroit 32, Mich. Data are presented on the three standard nib sizes in which the dressers are available for wheels ranging from a maximum diameter of 16 inches and a width of 1½ inches to wheels having a maximum diameter of 42 inches and a width of 8 inches. Complete instructions for ordering dressers are included in the booklet. Copy of Bulletin No. DR-480 free.

You need only one DORMAN TAPPER

... instead of three ordinary tappers ... to tap No. 2-56 to 3/8" in steel or any other metal.

Here are three more advantages

1. No collets to get lost or need replacement.
2. Adjustable friction drive.
3. Can produce No. 3 or No. 4 fit.

The No. 2A tapper drives from 3/4" to 7/8" and No. 3-A drives from 1/2" to 1 1/4" in any tapable material.

Price No. 1 Size \$44.00 with M.T. Shank or \$50.00 with Adapter for Male Spindle Drill Press. Round Split, Button or Acorn Die Holder Assemblies in stock for all size Dorman Tappers permitting their use for external threading.

Write for Die Holder Bulletin



DORMAN MACHINE TOOL WORKS

36 S. MAC QUESTEN PKWY.
MOUNT VERNON • NEW YORK

Heald Models 221 and 321 Bore-Matic Precision Finishing Machines. The Heald Machine Co., Worcester 6, Mass., has prepared a four-page bulletin which fully illustrates and describes single-end precision bore finishing machines for both rough and finish boring, turning, facing, chamfering, grooving, or fly cutting. Complete specifications are included. Copy free upon request.

Ex-Cell-O "Tool Tips," Vol. 22, No. 10. Published by the Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 6, Mich., this issue of "Tool Tips" features illustrated articles entitled "Standard Ex-Cell-O Precision Boring Machine Finishes Hard Rubber Parts," "Ex-Cell-O High Frequency Spindles Applied to Special Machine," "Ex-Cell-O Transfer Machines Speed Cylinder Block Operations," and "Continental Tools Bore and Face Jet Motor Castings." Copy free upon request.

Strand "Rotoflex" 4-Speed Gear Drive Flexible Shaft Machine for grinding, buffing, polishing, sanding, drilling, reaming, rotary filing, wire brushing, screw driving, nut setting, rasping, and many other operations are illustrated and described as to features, available types, specifications, and so on, in a four-page bulletin released by N. A. Strand & Co., 5006 N. Wolcott Ave., Chicago 40, Ill. Copy of Bulletin No. 43 free upon request.

Hanson Holding Fixture for application to jig borers, jig grinders, and other machines of a similar nature is depicted and described in a four-page folder prepared by Hanson & Co., 6527 Russell St., Detroit 11, Mich. Copy free upon request.

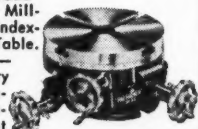


This PALMGREN

No. 000 ANGLE VISE for Milling, Drilling, Grinding, Etc.
Solve Difficult Angle Jobs. Get QUICK, ACCURATE, SET-UPS and save time, money, rejects. Accurately machined and graduated to full 90°. Also use horizontal. Steel Jaws 2½" plain or grooved.

Combination—Can't Be Beat!

No. 83 ROTARY TABLE With Dual Cross Feeds
For Drill Press, Lathe or Milling Machine. Combines Indexing, Milling and Rotary Table. Accurate and speedy — strong and sturdy. Rotary Feed calibrated in degrees, cross feed in thousandths. Low price. Get facts.



Immediate Delivery—Write for Circular 351

CHICAGO TOOL AND ENGINEERING CO.

8399 S. Chicago Ave. Chicago 17, Ill. Phone-Saginaw 9673

-Matic
Heald
, has
a fully
preci-
both
acing,
tting.
Copy

o. 10.
1200
is is-
rated
ell-O
Hard
Fre-
Ma-
ines
and
Jet
uest.

rive
uff-
ing,
riv-
ber
bed
ica-
etin
N.
of

ca-
ner
ted
re-
st.,
st.

General Flexible Power Presses. A six-page bulletin issued by the General Manufacturing Co., 6429 Farnsworth Ave., Detroit 11, Mich., contains descriptions and data on all-mechanical flexible power presses for production straightening, bending, assembling, push broaching, and cold riveting. The bulletin fully explains the unique mechanical operation of the presses and provides illustrations showing typical applications of the various models. A table of specifications is also included. Copy of Bulletin 392 free upon request.

Cincinnati No. 000-4 Unit Type Milling Machine, a production miller designed especially for the rapid, economical production of the multitude of small parts required in the manufacture of sewing machines, business machines, cash registers, firearms, small tools, and so on, is illustrated and described in a four-page folder released by The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. Principal specifications of the unit are included. Copy of Publication No. M-1622 free upon request.

S. S. White Flexible Shafts for remote control and power drives are featured in a 12-page bulletin prepared by the S. S. White Industrial Division, The S. S. White Dental Mfg. Co., 10 E. 40th St., New York 16, N. Y. Data are presented on the functions of flexible shafts, advantages of flexible shafts, nomenclature, construction, characteristics, torques for various horsepower and speeds, factors in selecting shafts for power drives and remote control, connecting flexible shafts, and so on. Copy of Bulletin 4501 free upon request.

Landis 6-Inch Type CH Plain Hydraulic Grinder. The Landis Tool Co., Waynesboro, Pa., is now issuing a four-page bulletin illustrating and describing the hydraulic-mechanical features of its 6-inch Type CH plain hydraulic grinder which is intended for the mass production of small ground parts such as bearings, small motor armatures, small shafts, roller bearing rings, airplane valves, electric razor heads, refrigerator compressor crankpins, pump spindles, automotive, aviation and precision machine parts. Optional features and special tooling for the grinder are also shown and described. Copy of Bulletin CB-47 free upon request.

MODERNIZE YOUR MILLS with
Speedmiller
UNIVERSAL MILLING HEADS
2 IMPROVED MODELS

of the Famous
HALCO UNIVERSAL MILLING HEAD



SPEEDMILLER

Cuts the Cost
of Milling, Bor-
ing and Profil-
ing, all angles.
Adaptable to all
Milling Machines.
More powerful!
Heavier spindles!
Larger bearings!

Fully Guaranteed!
Prompt deliveries on Speedmiller, Collets,
Floating Tool Holders, Form Tool Holders,
and Cut-off Tools for No. O and OO B&S.

WRITE for full information, prices,
and Dealerships available.

Veet Manufacturing Co.
EAST DETROIT MICHIGAN

SCHERR aids to precision — production



Save time on Surface Grinders With SCHERR MAGNE-BLOX

When placed on magnetic chuck, these magnetism-conducting parallels and angle irons will firmly hold small pieces and irregular shaped work. No need of special clamps or fixtures. THEY RETURN THEIR COST many times over by quicker setups, more accurate results, less danger of distortion and bowing when grinding thin flat work. Many different sizes and shapes. DON'T REGRIND YOUR MAGNETIC CHUCKS—BE WISE—USE MAGNE-BLOX—Special Offer: Set consisting of 2 parallels $1 \times 1\frac{1}{4} \times 3\frac{3}{4}$, plus 2 V-blocks, hard brass and Swedish iron laminations in solid metal case \$17.50. Money back if you can duplicate this value.



Scherr Cutting Tool Grinding Fixture

FOR SURFACE GRINDER, grinds both cutting angle and clearance in one setting. The unique patented feature is a tilting block which gives 3, 5, 7, or 10 degrees clearance to the tool, just the right cutting angle to suit the material to be machined. This simple inexpensive tool does the work of special machines. Clamp the tool to be ground in the Scherr Fixture, set to angle desired and tilt the

block to proper clearance. Special introductory price \$27.50, FOB New York, with Scherr money back guarantee.



Little Wonder Radius Dresser

Dresses wheels on surface or cylindrical grinders to any desired radius up to $1\frac{1}{2}$ " concave or convex. The swinging arm, the only moving part of this ingenious simple device, is pivoted on two lapped centers which never freeze or clog.

Supported on both ends with no overhang or slides, there can be no vibration of the diamond. Result: absolutely smooth and accurate radii on the wheel. The Diamond tool is set by means of Micrometers, Depth Gages or gage blocks. Price complete with $\frac{1}{2}$ carat diamond \$46.00—\$39.00 without.

Write for full details on these tools, and
for the Scherr Small Tool Catalog.

GEO. SCHERR CO., Inc.

198-A Lafayette St. New York 12, N.Y.

Gairing "E-Con-O-Mill," a standard face mill which utilizes the same blades and locks for all diameters 5 inches and over, is the subject of a four-page folder published by The Gairing Tool Co., P. O. Box 478, Roosevelt Park Annex, Detroit 32, Mich. The folder fully illustrates and describes the construction features of the carbide-tipped inserted blade cutter and presents complete engineering data on same. Copy free upon request.

Detroit-Trojan Tractor for traveling various material handling and other types of units on monorail tracks or rails by electric power is fully illustrated and described in a four-page bulletin prepared by the Detroit Hoist & Machine Co., 8201 Morrow St., Detroit 11, Mich. Various applications of the unit are depicted and discussed. Copy of Bulletin 810 free upon request.

"Di-Lifts." The Machine Tool Accessories Division, Montgomery & Co., 53 Park Pl., New York 7, N. Y., is now distributing a folder which illustrates and describes two types of "Di-Lifts" (portable, elevating type materials handling tables) which can be used in moving, lifting and lowering dies, supporting overhanging work, loading and unloading trucks, and so on. Copy free upon request.

Cincinnati "Filmatic" No. 2 Centerless Grinding Machine for grinding practically any imaginable shape or material classification—straight, taper, formed, or multiple diameter, metallic or non-metallic—is fully illustrated and described in an eight-page catalog published by Cincinnati Grinders Inc., Cincinnati 9, Ohio. Highlights of machine design are clearly presented and complete specifications of the unit are tabulated. Copy of Publication No. G-574 free upon request.

"Sure Strike" Ionized Arc Starter, a dry metallurgical compound that is said to be capable of retaining a magnetic charge imparted to it by a magnetic dispenser for use in welding thin steel sheet, assembly line tack-welding, plug-welding stamped assemblies, maintenance welding, and so on, is described in a six-page illustrated leaflet now available free from the Electrical Engineering Co., 335 Lemcke Bldg., 106 E. Market St., Indianapolis 4, Indiana.

"There Can Be No Doubt About Some Things" is the title of a four-page folder published by the Ajax Electric Co., Inc., Frankford Ave. at Delaware Ave., Philadelphia 23, Pa., which illustrates and discusses the use of Ajax-Hultgren electric salt bath furnaces in the simultaneous brazing and carburizing of steel parts; hardening molybdenum high speed steel tools; selective heating of parts; heat treating aluminum alloys; case hardening and annealing products, and so on. Copy free upon request.

"A Thousand Speeds at the Turn of a Wheel" is the title of a 12-page catalog published by U. S. Electrical Motors, Inc., Milford, Conn., which fully illustrates and describes the U. S. Varidrive Motor. Included in the catalog are color illustrations showing the internal construction, principle of operation, structural details, and so on, of the motor. Copy free.

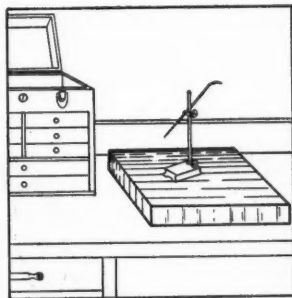
Cylinder Thrust Tables. A bulletin containing tables showing the thrust developed by and consumption of cylinders, capacities and pressure losses in pipes

and fittings, and piston rod column strength has been prepared by the Miller Motor Co., 4027 N. Kedzie Ave., Chicago 18, Ill. The tables are designed for use by non-technical personnel, as well as by engineers. Copy free upon request.

Heald Model 271 Toolroom Internal Grinding Machine, designed for the rapid, efficient handling of toolroom work where precision internal grinding is required, is fully illustrated and described as to construction features in a four-page bulletin released by The Heald Machine Co., Worcester 6, Mass. A table of specifications is included. Copy of Machine Bulletin No. 2-271-2 free upon request.

"Speed up Drilling, Reaming, and Boring Operations" is the title of a four-page folder now being distributed by the Acme-Danneman Co., Inc., 203-205 Lafayette St., New York 12, N. Y., which illustrates and describes various models of Esco Standard Drill Jigs and Esco "Mijit" Drill Jigs. Copy of the folder, together with complete price list, discount sheet, and drawings of jig templates, is available free.

Think of it--these fine **BENCH SURFACE PLATES** Only \$14.95 Each



Yes, you pay only \$14.95 each in lots of 8 or more (\$16.50 in smaller quantities) for these fine quality semi-steel 18"x18"x2" surface plates with top, ribs on bottom and all edges planed level and square. Price FOB Kellogg, Iowa. Wt. 98 lbs. net. Order while our stock lasts!

Midwest Metal Stamping Co. Kellogg, Iowa

Victor Saw Blade Chart. The Victor Saw Works, Inc., Middletown, N. Y., is now offering a chart which is intended for hanging over workbenches in industrial shops or on the wall near the tool cribs or bins. Large enough to be easily read (17 x 22 inches) and printed in two colors, the chart shows at a glance the proper hand, band, or power saw blade to use for cutting any type of metal. It further graphically illustrates the right and wrong way to use a metal-cutting saw blade and explains in detail how to overcome common metal-cutting troubles. Copy of the chart is available free.

Campbell Abrasive Cutting Tip Sheet. A four-page folder now being distributed by the Andrew C. Campbell Division, American Chain & Cable, Bridgeport, Conn., features information on a new nibbling technique which has been developed to speed up operations from the drawing board to template to actual nibbling. Typical applications of Campbell Nibbling Machines are illustrated and described. Copy of Nibbling Issue No. 1047 free upon request.

Monarch Type B "Air-Tracer," a lathe attachment which is designed to provide an economical production method for turning multiple diameter shafts and turning or boring increasing contours to a high degree of accuracy and finish, is fully covered in a 12-page profusely illustrated catalog released by The Monarch Machine Tool Co., Sidney, Ohio. Copy free upon request.

"New Pages in the Bliss Book of Advanced Press Design" is the title of a four-page brochure released by the E. W. Bliss Co., 450 Amsterdam Ave., Detroit 2, Mich. Several Bliss presses engineered during the past year are illustrated and described, including a briquetting press, triple-action toggle press, and single-crank toggle press. A new metal-spinning lathe is also covered. Copy free.

Heald Bore-Matic, a precision finishing machine designed for boring two or more holes from various directions simultaneously, is fully illustrated and described in a four-page bulletin prepared by The Heald Machine Co., Worcester 6, Mass. Specifications are included. Copy of Machine Bulletin No. 2-233-232-1 free.

BENCH KING
THE REVOLUTIONARY VISE IN SOLID BRONZE

**NEW VISE WITH FINGERS
GIVES YOU AN EXTRA HAND**

1. Holds any shape safely, securely, conveniently.
2. Saves time.
3. Use as an inexpensive jig.
4. Compact, light, removable.

PRICE ONLY \$14.95.



P.P. by m'fr. in U.S.A. Write for circular. Inquiries from dealers invited.

BENJ. UYDESS & SONS, INC.
960 East 167 St., Bronx 59, New York

"SKELTON" TAPER REAMERS

Two cutting edges ground radial on a taper to correspond with hole reamed. Two opposite edges are "backed off" enough to allow for proper thickness of chip. This "safety edge" prevents blade from "hogging in" or "chattering." Standard tapers in stock. Specials to order.

Write for Catalog 103.

ONONDAGA TOOL CORPORATION

Rougher FAYETTEVILLE NEW YORK Finisher





Pratt & Whitney Heavy Duty Hydraulic Vertical Surface Grinder, which is available in two sizes for accommodating a 26 or 30-inch diameter segmental wheel, respectively, is fully illustrated and described as to construction features, operating advantages, specifications, and so on, in an eight-page circular published by Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn. Copy of Circular No. 494 free.

"Down Go Turning Costs" is the title of a 36-page wire-bound catalog published by The Monarch Machine Tool Co., Sidney, Ohio, which contains illustrations and descriptions of a complete line of tool-maker's lathes, engine lathes, and automatic sizing lathes, as well as Shape-masters, Magna-Matics, Mona-Matics, Uni-Matics, and Air-Tracer attachments. Copy of the catalog is available free to mechanical executives addressing requests on their company letterheads.

"Rexon" Vibration Mounts, which are made in different sizes for weight loads varying from $\frac{1}{2}$ to 3,800 lb., are illustrated and described in an eight-page booklet prepared by the Hamilton Kent Manufacturing Co., Kent, Ohio. A table listing the various sizes in which the mounts are available, together with prices, is included in the booklet, as well as dimensional drawings presenting helpful engineering data. Copy free.

Cincinnati 8 x 18-Inch Tool and Die Milling Machine for the rapid production of plastic molds, permanent molds, die casting dies, metal patterns, and small drop-forging dies is illustrated and described as to construction features, dimensions, specifications, and so on, in an eight-page catalog published by The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. Copy of Publication No. M-1620 free upon request.

"Tube End Forming" is the title of a four-page bulletin published by the Vail Engineering Co., 17 Brown St., Waterbury 89, Conn., which illustrates and describes a complete line of machinery built for the specific purpose of forming and shaping the ends of tubing to close tolerances. Typical pieces of tubing which have been flared, beaded, grooved, flanged, and so on, on the machines are illustrated. Copy of Bulletin No. G-1 free.



**UNIVERSAL
DRILL BUSHINGS**

Universal Drill Bushings with superhoned bores have been the first choice of industry since the founder of Universal Engineering Co. originated standard drill bushings nearly 30 years ago. Available in standard and special sizes to speed and simplify your jig drilling at greatly reduced tool breakage costs. Order direct from the Universal Sales warehouse nearest you: 89 Main St., Ansonia, Conn., or 5629 Sixth St., Kenosha, Wisc.

YOUR ORDERS EXPEDITED BY TELETYPE.

**UNIVERSAL ENGINEERING CO.
FRANKENMUTH • MICHIGAN**

Jorgens Roller Bearing Pilot Bushings for use in fixtures, chucks, or spindles are illustrated and described in a four-page folder published by The Jorgens Co., 17118 St. Clair Ave., Cleveland 10, Ohio. Typical applications of the bushings are shown, and complete dimensional data on the two available styles of bushings are included. Copy free upon request.

Jarvis Rotary Files. A two-color 12-page catalog illustrating and describing a complete line of high speed and tungsten carbide rotary files has been issued by The Charles L. Jarvis Co., Middletown, Conn. The catalog pictures in detail more than 100 of the files in the company's line. Each file is illustrated in actual size so that the selection of the correct fluting and shape is facilitated. Copy of Catalog RF 101 free upon request.

Whiton Centering Machines. A four-page two-color folder issued by The Whiton Machine Co., New London, Conn., features illustrations and descriptions of the newest Whiton designs in centering machines and devotes space to complete engineering information in concise, easy-to-read form. Copy free upon request.

Hanchett Double Spindle Production Disc Grinders. A 12-page two-color bulletin describing the double spindle discs grinding method of finishing opposite faces of workpieces flat and parallel simultaneously is now being distributed by the Hanchett Manufacturing Co., Big Rapids, Mich. Hanchett's six standard double spindle disc grinders are illustrated, with brief specifications also presented. Photographs of actual job applications with a statement of the pieces produced per hour and the tolerances adhered to are included. Two pages are devoted to methods of presenting the work to the grinding wheel. Useful accessories are mentioned, and the construction of the machines is discussed. Copy of Bulletin 647-1 free upon request.

"Turn Waste Oil into Dollars" is the title of an eight-page catalog now being distributed by The Holden Co., Inc., 220 Delaware Ave., Buffalo 2, N. Y., which illustrates and describes a portable automatic oil refining unit that is said to be capable of completely refining user crankcase, refrigerating, or any other type of lubricating oil at the rate of 70 to 100 gallons a day. Copy free upon request.



HARTFORD SUPER-SPACER

Special

for QUICK INDEXING

on

Milling • Drilling • Grinding •
Jig Boring • Planing • Slotting •
Boring and other Operations

Illustrated is the Super-Spacer set up with drilling attachment. Flexibility of design allows for adjustment to various jobs within the range of the attachment. In this case the Super-Spacer permits quick-as-a-flash indexing on a job that calls for drilling spaced holes in a circular path. This is but one of the many time saving applications of the Super-Spacer. If your shop can use quick but accurate indexing, write Dept. S6.

Hartford Special also makes the "Four-point" Milling Vise and the "V-Block" Fixture proven time and money savers on Milling, Boring, and Inspection Set-ups.

HARTFORD

Special

The Hartford Special Machinery Co.
Hartford 5, Conn.

Hill Acme Divisions and Products. The Hill Acme Co., 6400 Breakwater Ave., N. W., Cleveland 2, Ohio, has prepared a four-page folder listing its various divisions and their products. The center spread of the folder illustrates and describes various Hill Acme tools for industry, including grinding and polishing machines, threading machines, tapping machines, forging machines, floor cranes, and alligator shears. Copy free.

"Accurate Contour Profiling on Springfield Geared Head Lathes" is the title of a four-page bulletin published by The Springfield Machine Tool Co., Springfield, Ohio. The bulletin illustrates and describes a super-sensitive hydraulically-operated stylus which is designed to duplicate practically any contour, and presents illustrations of typical pieces which can be produced on a Springfield lathe equipped with the attachment. Copy of Bulletin No. 167 free upon request.

South Bend Precision Lathes. The South Bend Lathe Works, South Bend 22, Ind., is now distributing a folder which attractively illustrates and describes the company's line of precision lathes, which include 9, 10, 13, 14½, and 16-inch machines of both the toolroom and quick-change gear types. Complete specifications of the various models are presented in tabular form, together with price information. Copy free upon request.

Rotor S-1 Scaling Hammer for weld flux scaling, weld spatter removal, paint and rust removal, light chipping, and so on, is fully illustrated and described in a four-page bulletin published by The Rotor Tool Co., 17325 Euclid Ave., Cleveland, Ohio. A cutaway view of the tool illustrates its various construction features, while other illustrations show typical applications of the unit. Copy of Bulletin No. 33 free upon request.

Barnes "Rapidraulic" Power Unit, a hydraulic unit particularly designed for clamping and similar applications, is covered as to construction features, specifications, installation, dimensions, and so on, in a catalog prepared by the John S. Barnes Corp., 154 Walnut St., Rockford, Ill. Operating instructions for the unit, as well as a price list, are included in the catalog, copy of which is available free.

January, 1948

Dependable B-RIGHT-ON SOCKET SCREW PRODUCTS



The dependable B-Right-On Socket Screw Products line includes Hollow Set Screws, Cap Screws, Hollow Pipe Plugs and Stripper Bolts. Production runs solicited. Our complete, centrally located stock is at your service if your dealer can't supply you. Catalog and engineering data on request.

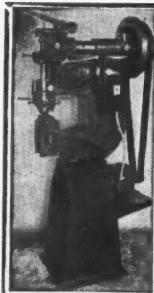
THE BRIGHTON SCREW & MFG. CO.
READING RD. AT DORCHESTER CINCINNATI 2, OHIO

MODERN MACHINE SHOP 351

Gilmore Diamonds for turning, boring, testing, and other industrial purposes are featured in a 40-page catalog prepared by F. F. Gilmore & Co., 285 Columbus Ave., Boston 16, Mass. Data are presented on diamond boring tools, diamond turning and facing tools, diamonds for hardness testing, diamond gage contacts, diamond styl, diamond tools (abrasive type), and diamond engraving tools.

Copy of Catalog No. 46 is available free to mechanical executives addressing requests on their company letterheads.

"How to Reduce Idle Equipment Time," an eight-page attractively printed catalog now being distributed by Chronolog, Inc., National Bank Bldg., Detroit 26, Mich., fully illustrates and describes the Chronolog Model X Ssystem of Production Control for labor distribution, payroll accounting, machine efficiency, cost records, production records, standards, scheduling, management controls, and numerous other applications. Copy of Bulletin EM-48C free upon request.



GRAY TURRET HEAD METAL CUTTER OR NIBBLER

N.A.M. Pioneer Award Given to Gray

Most modern Nibbler for Template Cutting, Tool Rooms, Shipbuilding, Aircraft Parts, Aircraft Tubing, Sheet & Plate Shops.

GRAY MACHINE CO.
Box 596, Philadelphia, Pa.

Gilmore Diamond Tools. A 36-page catalog now available from F. F. Gilmore & Co., 285 Columbus Ave., Boston 16, Mass., presents illustrated and descriptive data on octahedron shape diamonds, elongated shaped diamonds, hand diamond tools, needle-point diamonds, thread-grinding diamonds, radius forming diamonds, multiple diamond tools, and diamond impregnated tools. Illustrations of diamond mining operations are also included.

Copy of Catalog No. 45 is available free to mechanical executives addressing requests on their company letterheads.



Vinco

Automatic

CENTER PUNCH and UNIQUE ACCESSORIES NO HAMMER NEEDED

The one-hand punch for precision work on metal or wood, or staking nuts & bolts. Adjustable from 8 to 20 lbs. "Shock absorber action," for delicate work (jewelry, dies) 4 in. long, 1 1/2 oz. with unbreakable plastic handle. Money-Back Guarantee.

C15 Punch (as described above) \$2.75

C12 Punch (non-adjustable) \$1.70

C2 "Carboloy" Tungsten-Carbide Point For Marking Hard Metals, Glass \$1.25

MASTER KIT contains No. C15 punch, Self centering Attachment for precision-mounting all size hinges. "Carboloy," Tungsten-Carbide Point for marking hard metals, glass. 2 Hole-Cutting Points (.045", .090"). Chisel-Point for tooling all metals. Nail-Set Point for delicate setting. Hammer-Point for light hammer effects & riveting.

MASTER KIT COMPLETE with Wood Case, \$8.30
All Prices postpaid except C.O.D. Write for Descriptive Literature. Dealers Solicited.

VINCO PRODUCTS
Dept. AA, Asbury Park, N. J.



"What Electrode Would You Use to Weld a Specified Stainless or Alloy Steel?" is the title of a 10-page bulletin published by the Arcos Corp., 1515 Locust St., Philadelphia 2, Pa. The subject matter is divided into sections for easy reference and includes information on base metal identification of solid and clad materials, recommended types of electrodes, special considerations involving corrosion, and heat or strength properties, as well as suggestions for welding dissimilar metals. Also included is a complete chart of the trade names of stainless alloys as produced by the mills of the country. Copy of Bulletin 1047 free upon request.

A Real Spring Winder !

No. 1 Capacity 0 thru 3/32" wire \$1.50

No. 2 Capacity 0 thru 3/16" wire \$3.00

No. 3 Capacity 0 thru 5/16" wire \$5.00

Will earn its cost in one day. The Hjorth Perfection Spring Winder offers the ideal means of winding extension, compression, torsion, taper, double taper, or left hand springs. Try one in your shop. You'll like it and the price is reasonable.

HJORTH LATHE & TOOL CO.
10 BEACON STREET WOBURN, MASS.

,
og
c.,
h.,
n-
n-
c-
ls,
al-
M-

t-
&
a
d
s,
g
-
-
e
-



"THE PAGE COUNTER"

Because MODERN MACHINE SHOP contains nearly 400 pages of editorial features and blue ribbon advertisers, this guy is afraid his advertising won't be read. Says he'd rather be in a thin book for better display. Using the same logic, he would set up a retail store in the desert rather than in the main shopping district because there is less competition.

WHAT HE DOESN'T UNDERSTAND IS

that MODERN MACHINE SHOP is a veritable market place for metal working equipment. Buyers shop where the most merchandise is for sale. Each issue of MODERN MACHINE SHOP exhibits the greatest variety of

machines and tools available to buyers for their selection. It's an action-producing, digest size book that pulls inquiries which turn into sales. Results tell the story. Gardner Publications, Inc., Cincinnati 2, Ohio.



"Unbrako" Screw Calculator, which is designed to provide quick, accurate access to figures on standard types of Unbrako screw products, has been developed by the Standard Pressed Steel Corp., Box 556, Jenkintown, Pa. On the reverse side of the calculator is a chart of decimal equivalents.

Copy of the calculator is available free to mechanical executives addressing requests on their company letterheads.

Haller Press Room Equipment. The Haller Machine & Manufacturing Co., Inc., 7940 Tireman Ave., Detroit 4, Mich., announces a bulletin covering the Haller Model D-600 Hydraulic Stock Feed, Model D-610 Stock Straightener, and Model D-611 Scrap Cutter for use on punch presses with stock up to $\frac{1}{2}$ inch thick and 4 inches wide. Consisting of a four-page folder with two-page insert, the bulletin illustrates and describes each unit in detail. Controls and adjustments are identified, and operating features are explained in detail. Complete specifications are also included. Copy of this bulletin is available free upon request.

ATLAS UNIVERSAL JOINTS



Joint may be fitted to specification or with—

-  round bore
-  keyway
-  square hole
-  shoulder

Fitted to exact specification at a guaranteed saving per unit.

- Short stubby jaws for maximum strength and economy of space
- Made from heat treated alloy steel for maximum physical properties
- Bearings located maximum distance from joint center, cutting bearing load and wear
- Sizes over $1\frac{1}{2}$ " O.D. have grease reservoir, an Atlas exclusive
- Send blueprint for quotation, or write for catalog. Large stock on hand



GRAY & PRIOR
Makers of
Atlas and Vulcan Universal Joints

GRAY & PRIOR MACHINE CO., HARTFORD 5, CONN.
In the West: Link Belt Co., Los Angeles, San Francisco
Portland, Seattle, Oakland, Spokane, Dallas

Williams Model F-1 Die Making Machine for use in the production of dies, gages, cams, templates, machine parts, and various other types of work is fully illustrated and described in an eight-page catalog now being distributed by the Connecticut Tool and Engineering Co., 544 Iranistan Ave., Bridgeport 4, Conn. Typical samples of work being filed on the machine, as well as typical work performed on the machine, are illustrated. Dimensions and specifications of the unit are also included in the catalog, copy of which is available free upon request.

Airflex Pneumatic Riveters. To explain and illustrate how Airflex Pneumatic Riveters can be used in riveting unsupported work and brittle materials with safety, the Lemart Engineering Co., Plymouth, Ind., has released a four-page bulletin which shows a standard vertical model riveter being used in riveting a plastic knife handle to the knife blade, building up leather belt with links using long slender rivets, and fastening a steel cleat to wood. A double-end model riveter is shown being used to rivet both ends simultaneously of tie rods, toy wheel axles, and so on. Copy of Bulletin 74 free upon request.

AAF Multi-Duty Self-Cleaning Air Filter. An eight-page bulletin explaining the operation and application of a multi-duty self-cleaning air filter for engine and compressor service has been issued by the American Air Filter Co., Inc., 100 Central Ave., Louisville 8, Ky. Installation photographs, as well as detailed engineering data, are included. Copy of Bulletin No. 150 free upon request.

TAPERED SPIRAL END MILLS



For Clearance on Dies, Molds, Patterns.
Tapers $\frac{1}{2}^\circ$ to 7° . Flute length $\frac{1}{2}$ " to $3\frac{1}{2}$ ". Dealer Inquiries Invited.

Write for catalog.

Cadillac Cutter Co.
1611 Eastern S.E. Grand Rapids 7, Mich.

"Maxitorq" Floating Disc Clutches.

A 24-page installation and data book on "Maxitorq" Floating Disc Clutches has been prepared by The Carlyle Johnson Machine Co., Manchester, Conn. The book provides complete illustrated and descriptive information on the design principles, important features, applications, and available types of the clutches, as well as data on ring type, driving cups for adapting the floating disc clutches to various types of driven or driving members. Typical installations of the clutches are shown and briefly described. Copy of Installation and Data Book No. 47 free.

"How to Apply 'Packaged' A. C. Generators" is the title of a feature article presented in the 16-page "Synchronizer" Vol. 8, No. 3a published by the Electric Machinery Manufacturing Co., 821 Second Ave., S.E., Minneapolis 14, Minn. Included in the article are seven handy tables for generator and wire selection. Copy of the publication is available free upon request.

"Machining of Armco Stainless Steels" is the title of a 40-page booklet published by The American Rolling Mill Co., 703

Curtis St., Middletown, Ohio, which contains complete information on cutting rates and tool compositions for each grade of stainless steel. In addition, it provides hints for correct grinding, milling, and drilling. Fully illustrated, the booklet also discusses cutting fluids and other related subjects, and includes several pages of convenient tables. Copy free upon request.

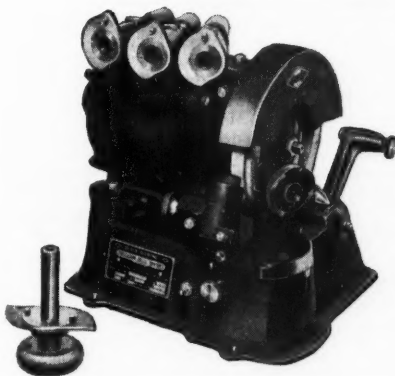
Miller Air Cylinders. The Miller Motor Co., 4027 N. Kedzie Ave., Chicago 18, Ill., has issued an eight-page bulletin which provides complete information on air cylinders with from 1½ to 14-inch bores. Single and double-rod end non-rotating cylinders are shown with and without cushions and with a choice of standard and many oversize piston rod diameters. Full mounting dimensions and installation drawings are presented on 16 models of double-acting and single-acting cylinders with and without spring return. Copy of Bulletin A-105 free upon request.

Correction

The location of the St. John X-Ray Laboratory is Callfon, New Jersey, not Clifton, New Jersey, as stated on page 320 of the December issue.

== BLACK DIAMOND ==

PRECISION • SMALL DRILL • GRINDER



IF you use small gauge or fractional drills—singly or in gangs—by hundreds or thousands—this moderately priced machine—motor driven—will keep any quantity sharp and ready for the job.

Anyone can operate a Black Diamond. Even the most inexperienced can keep all drills sharp and true centered, with smooth lips ground to exactly the same length—at the proper angle and with correct clearance for fast, precision drilling.

Black Diamond Grinders cut 50% and more on drill grinding as well as drilling costs, sharpen without waste of expensive drill stock, reduce drill breakage and work spoilage to a minimum.

The built-in Diamond Dresser keeps the grinding wheel ever-sharp cutting and the Web Thinning Attachment cares for all types of Notched points to perfection.

WRITE FOR COMPLETE DETAILS TODAY

BLACK DIAMOND SAW & MACHINE WORKS, INC.

45 NORTH AVENUE

NATICK, MASSACHUSETTS

New Films

Carbide Tool Grinding and Diamond Wheel Films

Realizing the advance that have been made in grinding carbide tools since its first film on this subject was made, the Norton Co., Worcester 6, Mass., has completed an entirely new motion picture incorporating up-to-date grinding techniques and recommended practices in grinding carbide tipped tools. Entitled "Grinding Carbide Tools," this 16 mm. Kodachrome sound film has a running time of 26 minutes and is devoted entirely to explaining and demonstrating the methods of grinding carbide single-point tools and carbide face mills of the three conventional types; namely, brazed carbide tipped, inserted blade type with carbide tipped blades, and inserted blade type with solid carbide blades.

A companion film on "The Diamond Wheel, Its Care and Use" is also being made available by the company. This entirely new 16 mm. Kodachrome sound film has a running time of 18 minutes and deals with the proper handling and

care of diamond wheels, portraying not only the care and precision in manufacture at the Norton plant but also the recommended procedure for obtaining the greatest possible benefit from each diamond wheel. The film is complete in itself and may be shown alone or may be used in conjunction with or as a preface to "Grinding Carbide Tools."

Information regarding bookings for either one or both of the films can be obtained by writing directly to the Norton Company.

Material Handling Film

Featuring a commentary by Lowell Thomas, a 16 mm. sound film on modern material handling technique is now being made available to businessmen's clubs, industrial study groups, company foremen's gatherings, and other groups interested in better production engineering know-how by The Yale & Towne Manufacturing Company. Entitled "It's Your Money," the film, which has a running time of 40 minutes, visualizes how 30 per cent of the production dollar goes into the mere movement, lifting, storage, re-handling, and shipping of materials and demonstrates dozens of ways in which to reduce that fraction.

The growth of the industrial power truck in the past 35 years is traced, and the different types of jobs properly performed by today's self-loading platform trucks, high-lift trucks, fork trucks, tractor-trailer systems, and crane trucks are delineated. Many ingenuities and quirks in electric truck manipulation are discussed and demonstrated.

Individuals desiring to obtain prints of the film on a loan basis are requested to write to James S. McCullough, The Yale & Towne Manufacturing Co., 4530 Tacony St., Philadelphia 24, Pa.

KEYWAYS

—ACCURATE and
UNIFORM with

The GLENNY

Adjustable Expansion
PUSH BROACH

because . . .



this sturdy simple tool can be used on any type arbor press for continuous efficient keyways — in any quantity

**COSTS OFTEN REDUCED
AS MUCH AS 10 TIMES**

SEND FOR
BULLETIN

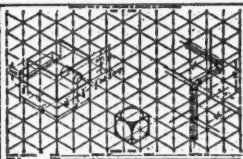
DEALERS
ALSO
WRITE

DEPT.
11.

The
**EAST SHORE
MACHINE PROD. CO.**
835 EAST 140th STREET
CLEVELAND 10, OHIO

ISOMETRIC SKETCHES ARE

**EASY TO MAKE
AND READ!**



One trial will make you another steady user of WADE'S ISOMETRIC blue lined paper. Shows all surfaces and interior to scale.

Makes clear blueprints. Saves time daily in hundreds of plants. Write for Circular.

Wade Instrument Co. 1422 E. 109th St.,
Dept. H, Cleveland, O.

IMMEDIATE DELIVERY
HIGH SPEED STEEL, STRAIGHT SHANK
TWIST DRILLS

Extra Length



9" CUTTING FLUTES—12" LONG DRILLS

| SIZE INCHES | LENGTH OVERALL INCHES | LENGTH FLUTES INCHES | PRICE EACH NET | SIZE INCHES | LENGTH OVERALL INCHES | LENGTH FLUTES INCHES | PRICE EACH NET |
|----------------|-----------------------------|----------------------------|----------------------|----------------|-----------------------------|----------------------------|----------------------|
| 1/8" | 12 | 9 | \$ 1.50 | 21/64" | 12 | 9 | \$ 2.25 |
| 9/64" | 12 | 9 | 1.50 | 11/32" | 12 | 9 | 2.25 |
| 5/32" | 12 | 9 | 1.50 | 23/64" | 12 | 9 | 2.50 |
| 11/64" | 12 | 9 | 1.50 | 3/8" | 12 | 9 | 2.50 |
| 3/16" | 12 | 9 | 1.50 | 25/64" | 12 | 9 | 2.75 |
| 13/64" | 12 | 9 | 1.60 | 13/32" | 12 | 9 | 2.75 |
| 7/32" | 12 | 9 | 1.60 | 27/64" | 12 | 9 | 3.00 |
| 15/64" | 12 | 9 | 1.75 | 7/16" | 12 | 9 | 3.00 |
| 1/4" | 12 | 9 | 1.75 | 29/64" | 12 | 9 | 3.25 |
| 17/64" | 12 | 9 | 1.85 | 15/32" | 12 | 9 | 3.25 |
| 9/32" | 12 | 9 | 1.85 | 31/64" | 12 | 9 | 3.25 |
| 19/64" | 12 | 9 | 2.00 | 1/2" | 12 | 9 | 3.25 |
| 5/16" | 12 | 9 | 2.00 | | | | |

HIGH SPEED STEEL, TAPER SHANK
TWIST DRILLS

Extra Length

| SIZE INCHES | LENGTH OVERALL INCHES | LENGTH FLUTES INCHES | PRICE EACH NET | SIZE INCHES | LENGTH OVERALL INCHES | LENGTH FLUTES INCHES | PRICE EACH NET |
|----------------|-----------------------------|----------------------------|----------------------|----------------|-----------------------------|----------------------------|----------------------|
| 17/32" | 15 | 12 | \$ 6.50 | 27/32" | 15 | 12 | \$11.50 |
| 9/16" | 15 | 12 | 7.00 | 7/8" | 15 | 12 | 12.00 |
| 19/32" | 15 | 12 | 7.50 | 29/32" | 15 | 12 | 12.50 |
| 5/8" | 15 | 12 | 8.00 | 15/16" | 15 | 12 | 13.00 |
| 21/32" | 15 | 12 | 8.00 | 31/32" | 15 | 12 | 14.00 |
| 11/16" | 15 | 12 | 8.25 | 1" | 20 | 15 | 16.00 |
| 23/32" | 15 | 12 | 8.50 | 1-1/16" | 20 | 15 | 17.00 |
| 3/4" | 15 | 12 | 8.50 | 1-1/8" | 20 | 15 | 18.00 |
| 25/32" | 15 | 12 | 9.50 | 1-3/16" | 20 | 15 | 20.00 |
| 13/16" | 15 | 12 | 11.00 | 1-1/4" | 20 | 15 | 22.00 |

VICTOR MACHINERY EXCHANGE, INC.

251 Centre St.

Phone: CAnal 6-5575

New York 13, N. Y.

SERVICES DIRECTORY

**GRINDING • STAMPINGS • TOOL and DIE WORK
MACHINE WORK • CASTINGS • HEAT-TREATING
FORGINGS • EMPLOYMENT • BUSINESS • ETC.**

PRECISION GROUND GEARS CAMS THREADS SPLINES

Excellent facilities for grinding gears, cams, threads and splines on a contract basis.

SEND BLUEPRINTS FOR ESTIMATE

HARTFORD SPECIAL MACHINERY COMPANY

**300 HOMESTEAD AVE.
Hartford, Conn.**

CENTERLESS GRINDING — Straight cylindrical, shoulder, profile and multiple diameters, any material analysis; also non-ferrous materials. Accurately ground taper pins and straight dowel pins. Brown & Sharpe and Swiss Automatic screw machine parts, heat treated and ground if necessary. Light bench type production drilling. Expanded facilities insure prompt and accurate service. Send blue prints or samples for estimates. The Porter Machine Co., 3139 Enyart Ave., Cincinnati 9, Ohio.

Tool & Cutter Grinding

**RESHARPENING OF HIGH SPEED
STEEL OR TUNGSTEN CARBIDE
MILLING CUTTERS - REAMERS
HOBS AND TAPS**

BROACH GRINDING

A Complete Resharpener Service for Flat or Circular Broaches up to 72" Length

CONTRACT MANUFACTURING

Production Milling - Turning - Drilling - Centertype External or Internal Grinding

*Also Manufacturers of
Special Metal Cutting Tools*

JOHNSON GRINDING SERVICE
3137 Vine St. Cincinnati, Ohio

PATTERNS

Wood and Metal — also Match Plates.
For all kinds of castings—large or small.
Estimates on Request.

GENERAL PATTERN WORKS
2231 Buck St., North of Harrison Ave.
Phone MAin 4751 Cincinnati, Ohio

AUTOMATIC AND HAND SCREW MACHINE PRODUCTS

... up to 1½" diameter — any material —
small or large quantities. Prompt service.

IMSANDE SCREW PRODUCTS CO.
3517 Cardiff Ave., Oakley, Cincinnati, Ohio

BAKELITE SILENT GEAR SERVICE

ALL SIZE BLANKS IN STOCK.

Teeth Cut To Your Specifications.
Prompt Delivery. Write for quotation.

Greaves Machine Tool Co.
2009 Eastern Avenue Cincinnati, Ohio

GRIND THE

*Eastern Centerless
Way*

Our new plant with
increased facilities
assures

PROMPT SERVICE

Eastern Centerless Grinding Co.
470 Tolland Street East Hartford 8, Conn.

METAL STAMPINGS

IN SMALL LOTS

A dependable service for twenty-five years. Write

DAYTON ROGERS
Manufacturing Company

Minneapolis 7, Minn.

SPECIAL METAL STAMPINGS

For experimental and model works. New method in making small, accurate parts from one and up.

Send prints for quotations

WITT-SMITH SPECIAL PARTS CO.

1131 Highland Ave.

Dayton 10, Ohio

ADVERTISING RATES for Services Directory

SENT UPON REQUEST

Write Modern Machine Shop
431 MAIN STREET, CINCINNATI 2, OHIO

AMA Insurance Series Booklets. Two additional booklets in its Insurance Series are announced by the American Management Association, 330 W. 42nd St., New York 18, N. Y. Booklet Insurance Series No. 65, "Trends In Workmen's Compensation and Employee Benefits," contains, in addition to an introduction, articles on Today's Problems Under Workmen's Compensation; Control of Workmen's Compensation Losses; The Employee's Viewpoint on Group Hospitalization and Medical Care; and Some Aspects of the Law of Aviation Workmen's Compensation. Copy of the booklet is available at a price of 75 cents.

Booklet Insurance Series No. 67, "Personnel Aspects of Insurance Planning," presents articles on Trends in Social Insurance; Educating the Employee in

A COMPLETE PRECISION GRINDING SERVICE

Centerless - Internal - External
Blanchard - Plain Surface
and Thread Grinding

Also a full production service under one roof.

Tool and Die—Metal Stamping—
Screw Machine—Heat Treating—
Induction Hardening and
Assembling Departments.

Send prints, sketch or samples for quotation



**ACE
MANUFACTURING CORP.**

1235 E. Erie Ave.

Philadelphia 24, Pa.

Dovetail, Flat and Circular Form Tools, Reamers, Counterbores

Prompt, Efficient Service. Attractive Prices
Send Your Inquiries to—

ANDERSONS, INC.

2331 Nelson Street

Chicago 18, Illinois

A dependable source for dies and metal stampings.

Send Prints for Quotations.

QUEEN CITY DIE & STAMPING, INC.

P. O. Box 2

Cincinnati 17, Ohio

Fire Loss Prevention; and Today's Problems in Crime Insurance. Copy of the booklet is available at a price of 75 cents.

"The Characteristics of Salary Grades, an article by Edward N. Hay, is the subject of a 16-page booklet prepared by the American Management Association, 330 W. 42nd St., New York 18, N. Y. The article describes the procedures employed in setting up an equitable structure of rate ranges and salary grades. The author shows how to apply rate ranges to single-rate jobs, how to raise the level of the salary structures, how to test for "symmetry," and so on. Copy of the booklet is available at a price of 25 cents.

WHERE TO GET IT



Numbers shown are page numbers in this issue

Abrasive Cloth, Paper, Discs, Belts, Stones, Etc., 64, 68, 69, 157, 186, 187, 289, 295

Adapters, 203

Air-Operated Equipment (Look for specific item)

Alloys, 321

Angles, 288

Arbors, 253

Backstands, 189

Balancing Machines, 7

Balancing Ways, 270

Bar Feeds, Pneumatic, 87

Bases, Machine, 167, 290

Bearing Machines, 84, 85

Bearings, Ball, Front Cover

Bearings, Roller, Front Cover, 1, 145

Bearings, Sleeve, 153

Bearings, Special, 145

Bearings, Thrust, 255

Belt Fasteners, 205

Belting, Twisted, Round, 205

Bench, Work, 264

Bending Machines, 46, 53, 108, 183, 303, 315

Beveling Machines, 271

Bins, 206

Bits, Power, 34

Blades, Cutting-Off, 230

Blocks, V, 259

Blowers, 215

Bolts, 122, 203

Boring and Facing Machines, 17

Boring Bars, 281

Boring, Drilling and Tapping Machines, Multiple, 17

Boring Heads, 298

Boring Machines, 103

Boring Mills, Vertical, 38

Boxes, Shop, 287

Brakes, Press and Bending, 108, 131, 174

Broaches, 356

Broaching Kits, 49

Broaching Machines, 8, 9, 118, 135

Buffers, Portable Electric, 115

Buffers, Portable Pneumatic, 115

Buffing Machines, 244, 372

Bur Tools, 282

Bushings, Drill Jig, 71, 156, 237, 291, 314, 349

Bushings, Rotary, 211

Cams, 265, 334, 343

Carbides, 101, 109

Casting Machines, 103

Centering Machines, Automatic, 75, 183

Centers, Lathe, Planer, Miller, Etc., 54, 253, 291, 293

Chasers, 2

Checking Rolls, 250

Chippers, Portable Pneumatic, 43, 215

Chuck and Indexing Fixtures, 272

Chuck Machines, Automatic, 113

Chucks, Air, 94

Chucks, Collet, 15, 231, 237

Chucks, Diaphragm, 238

Chucks, Drill, 15, 34, 301, 330

Chucks, Gear, 234

Chucks, Index, 231

Chucks, Lathe, 82, 94, 193, 223, 227

Chucks, Magnetic, 227

Chucks, Tap, 34, 247

Circle Cutting Machines, 84, 85

Circle Shear Machines, 84, 85

Clamps, 80, 122, 169, 233, 337, 342

Clamping Blocks, 329

Clutches, 160, 161, 220

Collets, 155, 265

Comparators, 77

Compressors, Air and Gas, 115, 215

Controlling Devices, 231

Coolants, 112, 133, 141

Counterbores, 63, 92, 96, 302

Countersinks, 51

Couplings, 39, 78, 160

Couplings, Flexible, 274

Cut-Off Machines, 183, 372

Cut-Off Wheels, 68, 69

Cutters, Bar, Rod, Etc., Hand, 46, 290, 309

Cutters, Scrap, 340

Cutter Sharpening Machines, 8, 9, 316, 368

Cutters, Keyway, 178, 277

Cutters, Milling, 29, 63, 92, 163, 179, 245, 293, 332

Cutting Machines, Tube and Pipe, 262

Cylinders, Hydraulic and Pneumatic, 32, 39, 110

Demagnetizers, 227

Desks, 264

Diamonds and Diamond Tools, 196, 212, 213, 251, 310

Diamond Powder, 196

Diamond Wheels, 60, 68, 69, 196

Dial Feeds, 106

Die Cushions, Pneumatic, 280

Die Feeds, 106, 249

Die Filers, 214

Die Heads, Threading, 216

Die Making Machines, 42, 170

Dies, 15, 113, 217, 239, 277, 332

Die Sets, 203, 255, 294

Die Try-Out Presses, 158

Dividing Heads, 227, 232, 253, 306

Dogs, Lathe, Grinder and Miller, 122, 169, 286

Dressing Fixtures, Grinding Wheel, 329, 346

Dressing Tools, 213

Drill Heads, 67, 192, 202, 276, 284, 299, 300

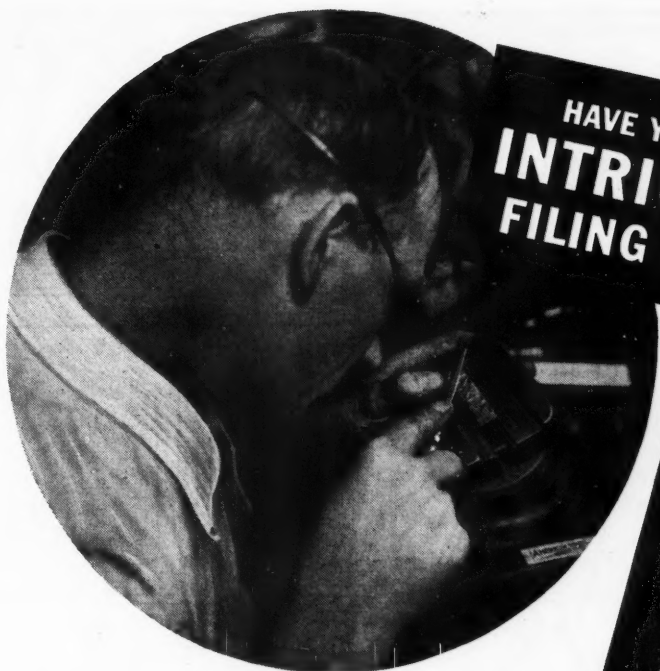
Drill Heads, Multiple Spindle, 334

Drilling and Tapping Units, Automatic, 334

Drilling Attachments, 254
Drilling Machines, Bench, 119, 242
Drilling Machines, Horizontal, 75
Drilling Machines, Multiple Spindle, 22, 285
Drilling Machines, Radial, 24, 83, 137, 149
Drilling Machines, Vertical, 46, 137, 273
Drilling, Milling, Tapping and Screw-Inserting Machines, Automatic, 47, 97
Drilling and Tapping Machines, Multiple Spindle, 334
Drilling Units, 58, 234
Drills, Center, Core, Twist, Square, Etc., 63, 152, 178, 302, 310, 332, 357
Drills, Portable Electric, 115, 372
Drills, Portable Pneumatic, 115, 215
Drives, 23
Drives, Motor, 226
Dust Control Equipment, 56, 100, 172, 177, 210, 372, 368
Engines, Diesel, 115, 215, 260
Engravers, Pantograph, 99, 260
Engraving Machines, 99, 267
Envelopes, 356
Etchers, 279, 298
Facing Heads, 318
Files, 51, 90, 159, 287, 363
Files, Rotary, 15, 51, 246
Filing Machines, 170, 260
Filters, 73
Finishing Machines, Internal, 37
Flanging Machines, 85
Floats, 241
Flexible Shaft Equipment, 15, 279
Forming Machines, Slip Roll, 84, 85, 150
Forming Presses, 53
Frames, Machine, 167
Furnaces, Heat-Treating, 98, 147
Furnaces, Melting, 266
Gage Blocks, 16, 89, 319
Gage Contacts, 251
Gages, 16, 39, 74, 77, 92, 156, 185, 193, 297, 327, 328, 330, 332
Gages, Tool Angle, 279
Gear Cutting Machines, 11, 316
Gears and Gear Units, 4, 102, 168, 205, 278, 296, 302, 314, 318, 330, 331
Grinders, Abrasive Band and Disc, 275
Grinders, Abrasive Belt, 48, 209
Grinders, Air, 43, 222
Grinders, Bench, 105, 372
Grinders, Carbide Tool, 93, 209, 324
Grinders, Chip Breaker, 209
Grinders, Cutter and Tool, 12, 13, 42, Third Cover
Grinders, Cylindrical, 3
Grinders, Drill, 42, 355, 368
Grinders, Face Mill, 42
Grinders, Flute, 154
Grinders, Gear, 72
Grinders, Internal, 3
Grinders, Pedestal, 226, 307, 372
Grinders, Portable and Tool Post, 267, 372
Grinders, Portable Electric, 191, 292
Grinders, Profile, 214
Grinders, Saw, 117
Grinders, Spline, 72
Grinder Spindles, 35
Grinders, Surface, 41, 111, 116, 142, 308, 365
Grinders, Tap, 256, 368
Grinders, Thread, 2, 6
Grinders, Universal, 12, 13

Grinding Compounds, 25, 68, 69, 241
Grinding Fixtures and Attachments, 346
Grinding Heads, 35
Grinding Wheels, 21, 25, 60, 64, 68, 69, 186, 187, 191, 295
Guns, Air, 39, 78
Hammers, Forge, Power-Driven, 334
Hand Tools, Power (Look for specific item)
Hardness Testing Devices, 61, 250
Hinges, 190, 239
Hobs, 63
Hoisting and Conveying Machinery, 215
Holders, Die, 216
Holders, Indicator, 333
Holders, Knurl, 317
Holders, Tap, 91, 235, 247, 322
Holders, Tool, 34, 122, 179, 212, 230, 235, 322, 368
Holders, Type, 239, 320
Honing Machines, 33, 103
Hose Fittings, Air and Welding, 39, 78
Hydraulic Equipment (Look for specific item)
Indicators, 102, 229, 327
Inspection Devices, 311
Jacks, 337
Jig Bore, 14
Jigs and Fixtures, 79, 193, 254, 334
Joints, Universal, 34, 354
Keys, Socket Screw, 190, 286, Fourth Cover
Keyway Cutting Machines, 236, 271
Lapping Compounds, 241
Lapping Machines, 103
Lathes, Automatic, 7, 19, 76
Lathes, Bench, 30, 119, 144, 271
Lathes, Engine and Toolroom, 30, 55, 66, 70, 76, 149, 225, 247, 278, Third Cover
Lathes, Polishing, 209, 372
Lathes, Speed, 251, 372
Lathes, Turret, 7, 19, 107
Layout Materials, 252, 306
Lift Trucks, 248
Light Wave Measuring Equipment, 16
Locating Tools, Optical, 267
Lubricants, 112, 133
Mallets, Rawhide, 205
Mandrels, Expanding, 178, 241
Marking Machines, 44, 334
Melting Furnaces, 266
Micrometers, 185, 328
Micrometer Stops, 326
Milling Fixtures, 345
Milling Machine Attachments, Second Cover, 8, 9, 95, 253, 259
Milling Machines, Bench, 86, 120
Milling Machines, Horizontal, 26, 27, 30, 163, 253, 259
Milling Machines, Profile, Contour, Tracer — Controlled, 99
Milling Machines, Universal, 8, 9, 367
Milling Machines, Vertical, Second Cover, 10
Mills End, 92, 207, 269, 318, 332, 354
Mills, Hollow, 29, 263
Molding Machines, 271
Molding Presses, 53, 247
Motors, 105, 121, 226
Mounted Points and Wheels, 191
Nibblers, 181, 309, 352
Notchers, 303
Numbering Machines, 323
Nut Runners, Portable Pneumatic, 115
Nut Setters, 372

- Oilers, 286
- Packings, Hydraulic, 205
- Pans, Tote, 290
- Pantographs, 99
- Parallels, 259, 346
- Pick-Off Attachments, 106
- Pillow Blocks, 145
- Pinion Cutting Machines, 316
- Pinions, 205
- Pins, 203, 283, 286, 291
- Planer-Millers, 38
- Planers, 38, 45
- Plates, Angle, 259
- Plates, Drilling, 329
- Plates, Surface, 259, 347
- Pliers, 243
- Polishing Machines, Die, 145, 209, 244
- Polishing Wheels, 60, 64, 295
- Power Units, Hydraulic, 32
- Presses, Air, 239
- Presses, Arbor, 49, 53, 277, 283
- Presses, Die Try-Out, 158
- Presses, Foot, 283
- Presses, Hydraulic, 53, 110, 162, 247, 275
- Presses, Pneumatic, 110
- Presses, Punch, 88, 114, 120, 283, 322
- Presses, Sub, 316
- Profiling Machines, 183
- Pullers, 251
- Pumps, Centrifugal, 62, 215
- Pumps, Coolant and Lubricant, 62, 104
- Pumps, Hydraulic, 50
- Pumps, Vacuum, 115, 237
- Punches, 217, 304, 352
- Punch Press Feeds, 322
- Pushers, 265
- Racks, 286, 291
- Racks, Bar and Tube, 160
- Reamers, 63, 92, 178, 293, 310, 332, 338, 348
- Reciprocating Tools, Electric, 20
- Riveters, Portable and Hand, 215
- Riveting Machines, 110, 271
- Roll Feeds, 106, 340
- Safety Equipment, Press, 166
- Sanders, Portable Electric, 115
- Sanders, Portable Pneumatic, 115, 215
- Sanding Machines, 316
- Saw Blades, Band, 40, 90, 173, 197, 198, 229, 243
- Saw Blades, Circular, 90
- Saw Blades, Hack, 25, 28, 40, 90, 198, 229, 243
- Saw Blades, Motor, 25
- Saw Blades, Slotting, 221
- Saw Frames, Hack, 243
- Saw Guides, Band, 335
- Sawing Machines, 170
- Sawing Machines, Band, 18, 31, 261, 275
- Sawing Machines, Circular, 117, 146
- Sawing Machines, Hack, 28, 50, 52, 204, 227
- Scalers, Portable Pneumatic, 43
- Scrapers, Hand and Power, 270
- Screw Drivers, Hand, 34
- Screw Drivers, Portable Electric, 115, 372
- Screw Drivers, Portable Pneumatic, 115, 215
- Screw Driving Machines, Power, 325
- Screw Machines, Automatic, 47
- Screws, Cap, Set, Socket and Machine, 36, 175, 351, 293, Fourth Cover
- Screws, Transfer, 237, 294
- Seamers, Double, 84, 85
- Services; Milling, Grinding, Lapping, Rebuild-
ing, Repairing, Business, Etc., 199, 240, 263,
312, 322, 358, 359
- Shaper-Planers, 45
- Shapers, 30, 45, 118, 131, 225
- Shearing Machines, 108, 131, 283
- Shears, 296
- Shims, 182, 268
- Slide Feeds, 106
- Slotting Machines, 45
- Sockets, 34, 122, 143, 169, 257
- Solenoids, 113
- Spacers, 79, 188, 350
- Spacing Collars, Arbor, 195, 268
- Special Machinery, 7, 24, 67, 135, 234, 285, 316,
334
- Speed Reducers, 208
- Spot Facers, 302
- Springs, 203, 306
- Spring Winders, 352
- Sprockets, 201
- Stamps, 239, 283, 288, 320, 323
- Steel, Bar, 59
- Steel, Die, 59, 199
- Steel, General Purpose, 25, 59
- Steel Stock, Ground Flat, 176, 229
- Stock Reels, 340
- Stretching Machines, 53
- Straightening Machines, 53, 106, 270, 340
- Stud Setters, 247
- Styli, 251
- Superfinishing Machines, 7
- Surfacing Machines, Abrasive, 244
- Switches, 227
- Swaging Machines, Hot or Cold, 334
- Tables, Elevating, 336
- Tables, Rotary and Index, 162, 253, 287, 332,
344, 296, 328
- Tapes, Measuring, 229
- Tap Extractors, 314
- Tappers, Hand, 255
- Tappers, Portable Electric, 115, 372
- Tapping Attachments, 15, 91, 247, 344
- Tapping Machines, 91, 242
- Tapping Machines, Automatic, 19
- Taps, 15, 65, 113, 171, 185, 216, 277, 332
- Taps, Collapsible, 2
- Threading Machines, 6, 19, 316
- Tool Bits, 90, 101, 109, 152, 179, 245, 322
- Tool Blanks, 57
- Tool Cribs, 258
- Tools, Boring, 57, 151, 251
- Tools, Bottoming, 151
- Tools, Broaching, 135
- Tools, Tangent Cut Box, 243
- Tools, Engraving, 251
- Tools, Facing, 251
- Tools, Form, 92, 343
- Tools, Internal Threading, 151
- Tools, Special Cutting, 57, 63, 92, 152, 322
- Tools, Truing, 251
- Tools, Turning, 251
- Tools, Turning, Concave-Convex, 148
- Traps, 241
- Turrets, Lathe, 339
- Valves, 39, 81, 110, 231, 241
- Vises, Bench and Machine, 20, 94, 122, 160,
194, 213, 219, 227, 253, 282, 310, 313, 317, 341,
342, 344, 348
- Wear Parts, 57
- Wrenches, 34, 122, 143, 169, 257
- Wrenches, Portable Pneumatic, 215



HAVE YOU AN
**INTRICATE
FILING JOB?**

Use "AMERICAN SWISS" Swiss-Pattern Files

Sharp edges, close corners, tiny fillets, delicate curves . . . the troublesome contours of intricate filing jobs . . . are best handled with "American Swiss" Swiss-Pattern Files. You can get these precision tools in widths as small as 1/16-in. thicknesses, as small as .025 gauge, and in cuts as fine as No. 6. The extensive "American Swiss" line of more than 3000 shapes, sizes and cuts provides a selection to meet every intricate filing need.



AMERICAN SWISS FILE & TOOL CO.

410 TRUMBULL STREET,

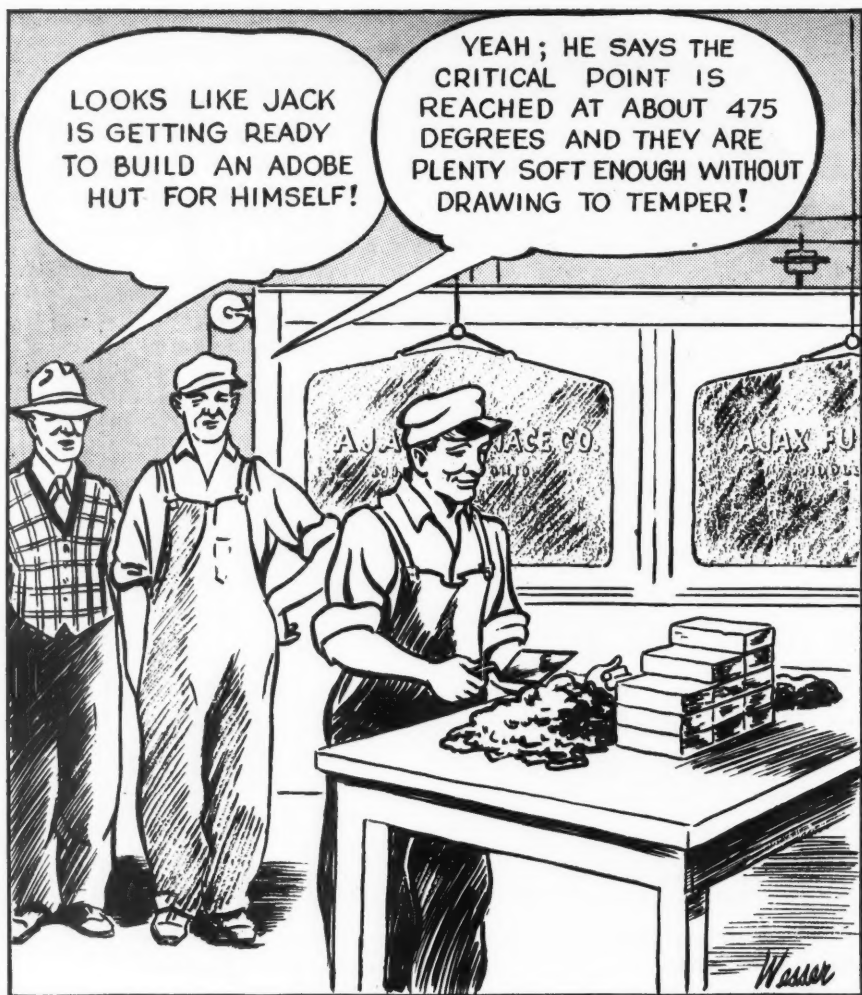
ELIZABETH 1, N. J.

ASK FOR THEM

BY NAME

American Swiss ★+★

SWISS PATTERN FILES



McGill's Carbide Tools. An eight-page catalog published by the McGill Carbide Tool Co., 4612 Woodward Ave., Detroit 1, Mich., provides illustrated, descriptive, and tabular information on standard carbide-tipped turning tools, standard carbide blanks, tipped boring tools, diamond dressers, carbide-tipped drills, solid carbide drills, tipped milling cutters, carbide-tipped reamers, and so on. Copy of Catalog 107 free upon request.

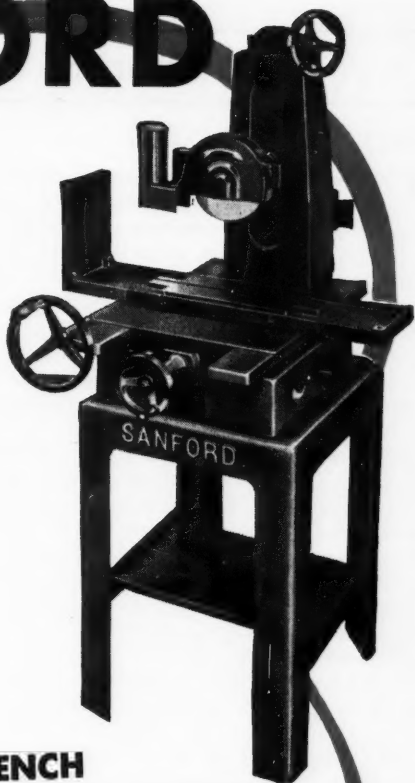
"Electric Feedrail for Portable Tools" is the title of a four-page bulletin now being distributed by the Feedrail Corp., 125 Barclay St., New York 7, N. Y. The bulletin provides a description of the Feedrail, an electric distribution system consisting of steel enclosed bus bars and mobile trolleys, as well as its use in providing power for production line tools, portable bench tools, bench type cutting machines, and so on. Copy free.

SANFORD

SURFACE GRINDERS

Model MG

Handles many odd size tool room and production jobs, due to its capacity of 8" x 12" x 12". Actual movements — Transverse 8 $\frac{3}{4}$ " — Longitudinal 13" — Vertical 12" (under 7" wheel).

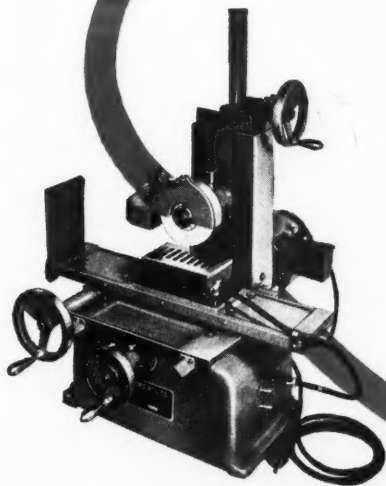


BENCH SURFACE GRINDER

Model SG

A sensitive, highly accurate machine specially designed "for the job that fits in your palm."

Actual movements — Transverse 4" — Longitudinal 8" — Vertical 6" (under 4" wheel).



WRITE FOR COMPLETE DETAILS

SANFORD MANUFACTURING CO.
1021 COMMERCE AVENUE
UNION, NEW JERSEY

Over the Editor's Desk

1948

THE beginning of a new year is a good time to take stock; to ascertain if possible what progress was made in the preceding year and to determine the prospects for continuing such progress—if any—through the year ahead.

The most serious problem of the moment is inflation, which, if not properly curbed, will plunge this country into chaos. The importance and imminence of this danger are such that the financial pages of the newspapers and magazines are presently filled with discussions of the problem and the many varieties of suggestions for remedying the evil. All the economists are agreed upon one point; that present prices must be held in obedience or reduced, but must not be reduced by methods which will bring on a depression.

Remedies for inflation include these; (1) to stop sending food and materials to Europe so as to increase our own supply, (2) to reduce our own consumption of food and goods by forcing the banks to increase the amount of money they must hold in reserve, thus forcing the banks to call in a large part of their loans and in turn reducing and restricting the amount of cash available to the public, (3) to attempt control of inflation through allocations, price control and rationing.

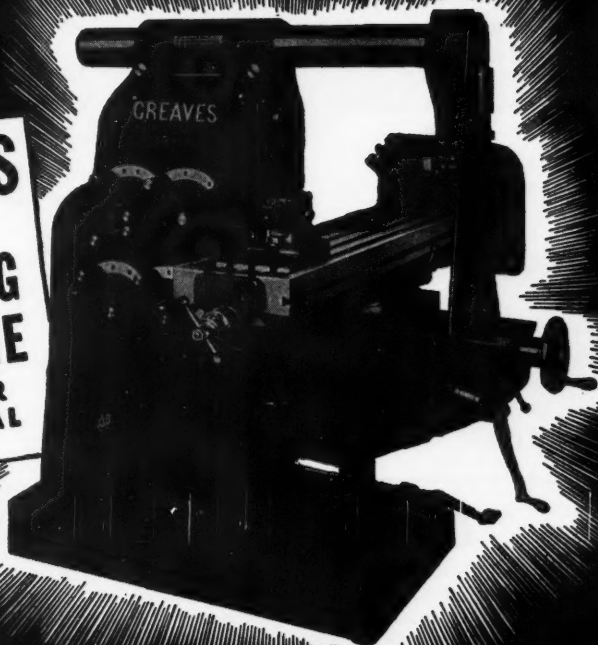
The first remedy is unthinkable. America not only is prosperous, but if it will produce all that it can in the way of goods and food it can easily do much toward helping its neighbors who are destitute largely due to circumstances over which they—or at least many of them—have no control. When a man is starving one doesn't ask him how he came to be in such circumstances; one feeds him and then tries to help him to maintain himself afterward. The second method might very easily bring about an oldtime "money panic" of the kind experienced in 1893 and 1907. Inability of industrialists to borrow money from the banks might result in layoffs and cutbacks which could easily throw the country into a depression. The third method would bring us to state socialism. Allocations, price control and rationing, developed far enough, would ultimately mean bureaucratization and ultimate death of private enterprise.

Probably the most immediate and most effective step that could be taken to control the menace of inflation would be for the President of the United States to call upon all labor organizations to suspend further demands for wage increases and to call upon those of the larger industries whose profits have multiplied since last year to reduce their prices. Such demands by the President would have immediate and salutary effect. However, it is unlikely that any such demands will be made by the President because he can't make one without making the other and he will not jeopardize his political chances with the labor vote by calling upon labor to refrain from further wage demands. Most of the formulas that have been suggested for reducing inflation can be discounted; the only formula necessary is a mixture of courage, unselfishness and statesmanship.

Howard Campbell

BUILT RIGHT! PRICED RIGHT!

GREAVES
No. 2-H
MILLING
MACHINE
PLAIN OR
UNIVERSAL



Simple in design. Easy to operate. Rigid construction including every worthwhile modern feature of milling machine development. With 18 spindle speeds (20 to 1000 R.P.M.) both the universal and plain millers are readily adaptable for heavy duty or light precision production work. Send for bulletin.

DEALER
TERRITORIES
AVAILABLE

Write for
complete details



Greaves **MACHINE TOOL CO.**

2001-17 EASTERN AVENUE, CINCINNATI 2, OHIO

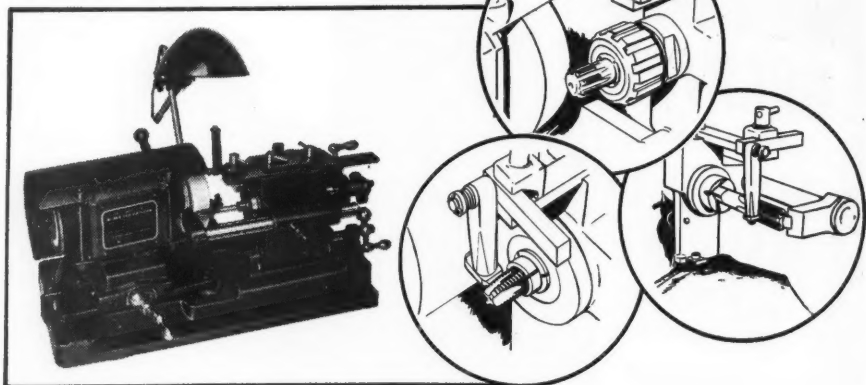


"FORMERLY 5,000 NOW 40,000 HOLES PER TAP"

We have many similar comments in our files from satisfied users of

Model No. 1 for taps up to 6" long

Model No. 2 for taps up to 14" long



The BLAKE TAP GRINDER

YOU TOO, if you use taps regularly, will find a Blake Tap Grinder one of your most profitable investments. You'll be amazed at the savings in tool and labor costs, the improved quality of threads, and the increased production—all directly traceable to using only sharp taps and having them always on hand.

With the BLAKE you can easily, quickly and accurately chamfer-sharpen taps with 2, 3, 4, 5, 6, 8 or 10 flutes—both right-hand and left-hand taps—from No. 0 to 2" diameter. All three methods of holding the tap are available: on the shank, on the O.D. of thread, and on centers. Also countersinks, 3- and 4-flute drills and reamers, engravers' bits, router bits and many other tools requiring relief on the point can be ground accurately and quickly on this versatile grinder.

Get the full details by sending the handy coupon today.

Please send me a free copy of the Bulletin which gives complete details on the Blake Tap Grinder.

M.M.S.

NAME _____ TITLE _____

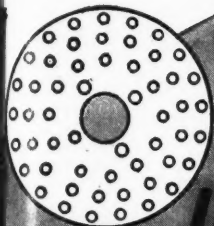
COMPANY _____

STREET _____

CITY _____ STATE _____

EDWARD BLAKE CO.
634 COMMONWEALTH AVE.
NEWTON CENTRE 59. MASS.

BLAKE TAP GRINDERS—FILTARE PORTABLE DUST COLLECTORS—AMERICAN TOOL HOLDERS—BLACK
DIAMOND PRECISION DRILL GRINDERS—WALTHAM CUTTER SHARPENERS



INDEX TO ADVERTISEMENTS

| | |
|--|-----|
| Abart Gear & Machine Co. | 168 |
| Abrasive Machine Tool Co. | 37 |
| Accurate Bushing Co. | 71 |
| Acme Industrial Co. | 291 |
| Acme Machine Tool Co. | 76 |
| Acme Tool Co. | 20 |
| Acme Wire & Iron Works | 258 |
| Acromark Co. | 320 |
| Advance Machine Works | 342 |
| Agat-Detroit Co. | 56 |
| Air-Hydraulics, Inc. | 275 |
| Alco Tool Co. | 235 |
| Allied Products Corp. | 304 |
| Almond Mfg. Co., T. R. | 330 |
| Alpha Tool Works | 158 |
| AlSCO Co. | 306 |
| American Air Filter Co. | 177 |
| American Broach & Machine Co. | 135 |
| American Emery Wheel Works | 21 |
| American Pipe Bending Machine Co., Inc. | 315 |
| American Society of Tool Engineers | 305 |
| American Swiss File & Tool Co. | 363 |
| American Tool Works Co. | 149 |
| Ames Co., B. C. | 102 |
| Anderson Bros. Mfg. Co. | 270 |
| Annis Co., R. B. | 298 |
| Apex Machine & Tool Co. | 34 |
| Armstrong-Blum Mfg. Co. | 28 |
| Armstrong-Bray & Co. | 251 |
| Armstrong Bros. Tool Co. | 122 |
| Atlantic Gear Works | 314 |
| Atlantic Saw Mfg. Co. | 173 |
| Atlas Press Co. | 86 |
| Auto Engraver Co., Inc. | 99 |
| Auto Moulding & Mfg. Co. | 239 |
| Avey Drilling Machine Co. | 22 |

| | |
|--|-----|
| Barber-Colman Co. | 29 |
| Barnes Co., Inc., W. O. | 40 |
| Bartelt Engr. Co. | 328 |
| Bath & Co., Inc., John | 185 |
| Baumbach Mfg. Co., E. A. | 294 |
| Bay State Abrasive Products Co. | 289 |
| Beaver Gear Works | 331 |
| Behr-Manning Corp. | 157 |
| Bellows Co. | 219 |
| Benchmark Mfg. Co. | 120 |
| Benton Co. | 279 |
| Bealy & Co., Charles H. | 171 |
| Bicknell-Thomas Co. | 302 |
| Billings & Spencer Co. | 143 |
| Black Diamond Saw & Machine Works, Inc. | 355 |
| Black Drill Co. | 152 |
| Blake Co., Edward | 368 |
| Bloomfield Tool Corp. | 334 |
| Bodine Corp. | 97 |

| | |
|---------------------------------|-----|
| Boggis & Co., H. P. | 256 |
| Bokum Tool Co. | 151 |
| Boyar-Schultz Corp. | 111 |
| Bremil Mfg. Co. | 296 |
| Brewster-Squires Co. | 267 |
| Brighton Screw & Mfg. Co. | 351 |
| Brown-Brockmeyer Co., Inc. | 105 |
| Brown Engr. Co. | 160 |
| Brown & Sharpe Mfg. Co. | 77 |
| Buffalo Forge Co. | 46 |
| Buhr Machine Tool Co. | 67 |
| Bullard Co. | 183 |
| Burke Machine Tool Co. | 259 |
| Busch Co., J. C. | 288 |

| | |
|--|--------|
| Cadillac Cutter Co. | 354 |
| Carboloy Co., Inc. | 57 |
| Carborundum Co. | 68, 69 |
| Carroll & Jamieson Machine Tool Co. | 278 |
| Carson-Newton Co. | 287 |
| Center Scope Products Co. | 267 |
| Cerro de Pasco Copper Corp. | 321 |
| Challenge Mchry. Co. | 259 |
| Chicago Pneumatic Tool Co. | 115 |
| Chicago Rawhide Mfg. Co. | 205 |
| Chicago Screw Co. | 175 |
| Chicago Tool & Engr. Co. | 344 |
| Chicago Wheel & Mfg. Co. | 191 |
| Cimcool Div., Cincinnati Milling Machine Co., | 141 |
| Cincinnati Bickford Tool Co. | 137 |
| Cincinnati Electrical Tool Co. | 372 |
| Cincinnati Gear Co. | 330 |
| Cincinnati Milling Machine Co. | 9 |
| Cincinnati Planer Co. | 38 |
| Cincinnati Shaper Co. | 131 |
| Cincinnati Tool Co. | 80 |
| Circular Tool Co. | 221 |
| Clark Instrument, Inc. | 250 |
| Cleveland Punch & Shear Works | 217 |
| Cleveland Republic Tool & Gage Co. | 311 |
| Colonial Blower Co. | 172 |
| Colonial Bushings, Inc. | 237 |
| Commander Mfg. Co. | 284 |
| Commercial Centerless Grinding Co. | 283 |
| Comtor Co. | 297 |
| Consolidated Mchry. & Supply Co., Ltd. | 146 |
| Continental Machine Co. | 262 |
| Continental Tool Works, Div. of Ex-Cell-O Corp. | 96 |
| Cooley Electric Mfg. Corp. | 147 |
| Covel Mfg. Co. | 308 |
| Cratex Mfg. Co. | 295 |
| Crosman & Son, Inc., J. B. | 142 |
| Cullman Wheel Co. | 201 |
| Cunningham Co., M. E. | 283 |

| | | | |
|--|---------------|--|--------|
| Dahlstrom Mfg. Co. | 255 | Industrial Enterprises, Inc. | 342 |
| Dallett Co. | 78 | Industrial Products Suppliers | 288 |
| Daily Machine Specialties, Inc. | 255 | Ingersoll Milling Machine Co. | 162 |
| Davis Keyseater Co. | 271 | Ingersoll-Rand Co. | 215 |
| Dayton Rogers Mfg. Co. | 280 | | |
| Dearborn, J. W. | 272 | Janette Mfg. Co. | 208 |
| Delco Products Div., General Motors Corp. | 121 | Jarvis Co., Charles L. | 15 |
| Denison Engr. Co. | 162 | Jefferson Machine Tool Co. | 316 |
| Derbyshire, Inc., F. W. | 144 | Johnson Bronze Co. | 153 |
| Desmond-Stephan Mfg. Co. | 213 | Johnson Machine Co., Carlyle | 161 |
| Detroit Boring Bar Co. | 281 | Johnson Mfg. Corp. | 31 |
| Detroit Power Screwdriver Co. | 325 | | |
| Detroit Stamping Co. | 233 | Kalamazoo T. & S. Co. | 13 |
| Dickerman Mfg. Co., H. E. | 249 | Keene Valley Engr. Co. | 326 |
| Disston & Sons, Inc., Henry | 90 | Kempsmith Machine Co. | 253 |
| Dorman Machine Tool Works | 344 | Kennametal, Inc. | 101 |
| Dowding & Doil, Ltd. | 116 | Keo Cutters | 178 |
| Dreis & Krump Mfg. Co. | 174 | Knight Mchry. Co., W. B. | 10 |
| Dremel Mfg. Co. | 292 | Koebel Diamond Tool Co. | 310 |
| Ducon Co. | 210 | | |
| du Mont Corp. | 49 | L-W Chuck Co. | 227 |
| Dykem Co. | 252 | LaBahn Machine & Mfg. Co. | 340 |
| | | Lafayette Tool & Supply Co. | 332 |
| East Shore Machine Products Co. | 356 | Laminated Shim Co., Inc. | 182 |
| Eastern Tool Supply Co. | 310 | Landis Machine Co. | 2 |
| Economy Tool & Machine Co. | 156 | Landis Tool Co. | 12, 13 |
| Elk Tools, Inc. | 212 | Langelier Mfg. Co. | 334 |
| Enco Mfg. Co. | 339 | LeBlond Machine Tool Co., R. K., Third Cover | |
| Errington Mechanical Laboratories | 247 | Lee Co., K. O. | 301 |
| Evans Reamer & Machine Co. | 338 | Lehmann Machine Co. | 55 |
| | | Leiman Brothers, Inc. | 237 |
| F & M Sales, Inc. | 328 | LeMaire Tool & Mfg. Co. | 234 |
| Falcon Tool Co. | 92 | Lewthwaite Machine Co., T. H. | 290 |
| Fanco Machine Co. | 283 | Lima Electric Motor Co. | 226 |
| Farrel-Birmingham Co., Inc. | 4 | Lincoln Park Mfg. Co. | 322 |
| Fellows Gear Shaper Co. | 11 | Lindermere Machine & Tool Co. | 192 |
| Firth-Sterling Steel & Carbide Corp. | 199 | Lipe-Rollway Corp. | 87 |
| Fiske Bros. Refining Co. | 112 | Littleford Bros., Inc. | 290 |
| Flynn Mfg. Co. | 298 | Lodge & Shipley Co. | 76 |
| Fonda Gage Co. | 319 | Lovejoy Flexible Coupling Co. | 274 |
| Foot-Burt Co. | 83 | Lucas & Son, Inc., J. L. | 290 |
| Ford Motor Co., Johansson Div. | 89 | Luers, J. Milton | 290 |
| Fosdick Machine Tool Co. | 14 | Luma Electric Equipment Co. | 279 |
| Freyman & Sons, J. E. | 148 | Lyon-Raymond Corp. | 248 |
| Fulfo Specialties Co., Inc. | 62 | | |
| Fulmer Co., C. Allen | 103 | | |
| | | M & N Machine Tool Works | 247 |
| Gallmeyer & Livingston Co. | 41 | Madison-Kipp Corp. | 222 |
| Gammans-Hoaglund Co. | 293 | Mahon Co., R. C. | 167 |
| Genales, Andrew | 327 | Manhattan Rubber Div. | 60 |
| Giern & Anholt Tool Co. | 211 | Marshall Steel | 176 |
| Gilmore & Co., F. F. | 251 | Marvel Tool & Machine Co. | 291 |
| Gisholt Machine Co. | 7 | Master Machine & Gear Works, Inc. | 296 |
| Gorton Machine Co., George | Second Cover | Mattison Machine Works | 189 |
| Govro-Nelson Co. | 58 | Mead Specialties Co. | 239 |
| Graham Mfg. Co., Inc. | 317 | Meinhardt Diamond Tool Co. | 212 |
| Grant Mfg. & Machine Co. | 271 | Michigan Chrome & Chemical Co. | 306 |
| Gray Machine Co. | 352 | Michigan Drill Head Co. | 202 |
| Gray & Prior Machine Co. | 354 | Michigan Tool Co. | 118 |
| Greaves Machine Tool Co. | 278, 318, 367 | Midwest Metal Stamping Co. | 347 |
| Greenlee Bros. & Co. | 47 | Miller-Knuth Mfg. Co. | 204 |
| Grob Brothers | 260 | Milwaukee Chaplet & Mfg. Co. | 214 |
| Grobet File Co. of America | 51 | Modern Collet & Machine Co. | 265 |
| Gwilliam Co. | 255 | Modern Machine Shop | 353 |
| | | Molina Industrial Diamond Co., Inc. | 196 |
| Hamilton Tool Co. | 242 | Moline Tool Co. | 285 |
| Hammond Mchry. Builders, Inc. | 209 | Monarch Machine Tool Co. | 66 |
| Hannifin Corp. | 110 | Montgomery & Co., Inc. | 336 |
| Hanson-Whitney Machine Co. | 6 | Morris Machine Tool Co. | 24 |
| Harding Brothers, Inc. | 155 | Motch & Merryweather Mchry. Co. | 117 |
| Hardware Sales Co. | 337 | Mummert-Dixon Co. | 318 |
| Hartford Special Mchry. Co. | 350 | | |
| Harvey Mfg. Corp. | 170 | National Acme Co. | 113 |
| Heald Machine Co. | 3 | National Automatic Tool Co. | 17 |
| Helm Co. | 145 | National Machine Tool Co. | 309 |
| Helmann Mfg. Co. | 294 | National Tool Salvage Co. | 312 |
| Hendey Machine Co. | 225 | National Twist Drill & Tool Co. | 63 |
| Hjorth Lathe & Tool Co. | 352 | | |
| Holo-Krome Screw Corp. | Fourth Cover | | |

| | | |
|-------------|--|-------------|
|342 | Nebel Machine Tool Co. | 247 |
|268 | New Method Steel Stamps, Inc. | 239 |
|215 | Niagara Machine & Tool Works | 84, 85 |
|215 | Nichols-Morris Corp. | 232 |
|208 | Nicholson & Co., W. H. | 241 |
|205 | Nicholson File Co. | 159 |
|15 | Nielsen Tool & Die Co. | 237 |
|316 | Nobur Mfg. Co. | 282 |
|153 | Norgren Co., Inc., C. A. | 73 |
|361 | Norma-Hoffmann Bearings Corp. | First Cover |
|178 | North Bros. Mfg. Co. | 341 |
|10 | Norton Co. | 186, 187 |
|310 | Nu-Tangs, Inc. | 263 |
|310 | Numberall Stamp & Tool Co. | 323 |
|326 | O. K. Tool Co. | 179 |
|101 | Oliver Instrument Co., Inc. | 42 |
|178 | Oliver Mchry. Co. | 275 |
|10 | O'Neill-Irwin Mfg. Co. | 108 |
|310 | Onondaga Tool Corp. | 348 |
|227 | Paddock Tool Co. | 335 |
|340 | Palmer-Shile Co. | 81 |
|332 | Penjaska Tool Co. | 330 |
|182 | Phillips Bros. Screw Products Co. | 333 |
|2 | Pines Engr. Co., Inc. | 183 |
|12, 13 | Pittsburgh Stamp Co., Inc. | 288 |
|334 | Pope Mchry. Corp. | 35 |
|Cover | Porter-Cable Machine Co. | 48 |
|301 | Porter Machine Co. | 254 |
|55 | Power Plus Products Co. | 32 |
|237 | Precise Products Co. | 267 |
|234 | Preis Engraving Machine Co., H. P. | 260 |
|290 | Proconruler Safety Chuck Co. | 91 |
|226 | Production Devices, Inc. | 194 |
|322 | Production Machine Co. | 244 |
|192 | Producto Machine Co. | 203 |
|87 | Prosser & Son, Thomas | 93 |
|290 | Putnam Tool Co. | 269 |
|76 | Quality Tool Works | 293 |
|274 | Queen City Machine Tool Co. | 307 |
|290 | Racine Tool & Machine Co. | 50 |
|230 | Raybestos-Manhattan, Inc., Manhattan | 60 |
|279 | Rubber Div. | 236 |
|248 | Reading Machine Co. | 54 |
|247 | Ready Tool Co. | 231 |
|222 | Redmar Air Devices Corp. | 74 |
|167 | Republic Gage Co. | 107 |
|60 | Rivett Lathe & Grinder, Inc. | 64 |
|176 | Roberts Rubber Co., Weldon | 220 |
|291 | Rockford Clutch Div., Borg-Warner Corp. | 45 |
|296 | Rockford Machine Tool Co. | 263 |
|189 | Rogers Tool Corp., John M. | 43 |
|239 | Rotor Tool Co. | 95 |
|212 | Rusnok Tool Works | 104 |
|306 | Ruthman Mchry. Co. | 190 |
|202 | S & S Machine Works | 52 |
|118 | Sales Service Machine Tool Co. | 150 |
|347 | San Angelo Foundry & Mchry. Co. | 365 |
|204 | Sanford Mfg. Co. | 181 |
|214 | Savage Co., W. J. | 251 |
|265 | Schauer Machine Co. | 346 |
|353 | Scherr Co., Inc., George | 44, 334 |
|196 | Schmidt, Inc., Geo. T. | 39 |
|285 | Schrader's Son, A. | 240 |
|66 | Screw Machine Specialty Co. | 23 |
|336 | Scully-Jones & Co. | 88 |
|24 | Seneca Falls Machine Co. | 358, 359 |
|117 | Service Machine Co. | 246 |
|318 | Services Directory | 30 |
|113 | Severance Tool Industries, Inc. | 273 |
|17 | Sheldon Machine Co., Inc. | 70 |
|309 | Sibley Machine & Foundry Corp. | 25 |
|312 | Sidney Machine Tool Co. | 94 |
|63 | Simonds Saw & Steel Co. | 25 |
|63 | Skinner Chuck Co. | 25 |

| | | |
|-------------------------|--|----------|
|357 | Snap-On Tools Corp. | 357 |
|119, 237, 286, 298 | South Bend Lathe Works | 298 |
|306 | Stackbin Corp. | 306 |
|291 | Standard Horse Nail Corp. | 291 |
|36, 264 | Standard Pressed Steel Co. | 264 |
|286 | Standard Steel Specialty Co. | 286 |
|271 | Standard Tool Co. | 271 |
|229 | Starrett Co., L. S. | 229 |
|287 | Sterling Factory Equipment Co. | 287 |
|287 | Stevens, Inc., John B. | 287 |
|343 | Sites Tool Co. | 343 |
|166 | Strand Mfg. Co. | 166 |
|279 | Strand & Co., N. A. | 279 |
|293 | Strong, Carlisle & Hammond Co. | 293 |
|306 | Strutz & Mead, Inc. | 306 |
|133 | Sun Oil Co. | 133 |
|75 | Sundstrand Machine Tool Co. | 75 |
|33 | Sunnen Products Co. | 33 |
|245 | Super Tool Co. | 245 |
|266 | Surface Combustion Corp., Heat Treat Div. | 266 |
|72 | Taft-Peirce Mfg. Co. | 72 |
|329 | Tallman Tool & Machine Corp. | 329 |
|197 | Tannewitz Works | 197 |
|302 | Taylor Machine Co. | 302 |
|98 | Thermo Electric Mfg. Co. | 98 |
|223 | Thomas Holst Co. | 223 |
|198 | Thompson & Co., Henry G. | 198 |
|277 | Threadwell Tap & Die Co. | 277 |
|276 | Thriftmaster Products Corp. | 276 |
|1 | Timken Roller Bearing Co. | 1 |
|100 | Torit Mfg. Co. | 100 |
|286 | Trico Fuse Mfg. Co. | 286 |
|296, 306 | Troyke Mfg. Co. | 296, 306 |
|109 | Tungsten Electric Corp. | 109 |
|59 | Union Drawn Div., Republic Steel Corp. | 59 |
|216 | Union Twist Drill Co., Butterfield Div. | 216 |
|299 | United States Drill Head Co. | 299 |
|241 | United States Products Co. | 241 |
|349 | Universal Engr. Co. | 349 |
|243 | Utica Drop Forge & Tool Corp. | 243 |
|348 | Uydess & Sons, Inc., Benj. | 348 |
|322 | V & O Press Co. | 322 |
|16 | Van Keuren Co. | 16 |
|26, 27 | Van Norman Co. | 26, 27 |
|313 | Van Products Co. | 313 |
|345 | Vee Mfg. Co. | 345 |
|282 | Veit & Young | 282 |
|357 | Victor Mchry. Exchange | 357 |
|243 | Victor Saw Works, Inc. | 243 |
|352 | Vinco Products | 352 |
|79 | Vulcan Tool Co. | 79 |
|356 | Wade Instrument Co. | 356 |
|275 | Walls Sales Corp. | 275 |
|316 | Waltham Machine Works | 316 |
|314 | Walton Co. | 314 |
|154 | Wardwell Mfg. Co. | 154 |
|19 | Warner & Swasey Co. | 19 |
|243 | Watson Mfg. Co. | 243 |
|302 | Watts Bros. Tool Works | 302 |
|207 | Weldon Tool Co. | 207 |
|261 | Wells Mfg. Corp. | 261 |
|314 | West Coast Aero Tool Co. | 314 |
|82 | Westcott Chuck Co. | 82 |
|190 | Whitney Chain & Mfg. Co. | 190 |
|303 | Whitney Metal Tool Co. | 303 |
|106 | Whyte Engr. Co. | 106 |
|114 | Wiedemann Machine Co. | 114 |
|324 | Wiley's Carbide Tool Co. | 324 |
|169 | Williams & Co., J. H. | 169 |
|53 | Wilson, K. R. | 53 |
|61 | Wilson Mechanical Instrument Co. | 61 |
|65 | Winter Bros. Co. | 65 |
|318 | Woodson Tool Co. | 318 |
|193, 238 | Woodworth Co., N. A. | 193, 238 |
|322 | Ziegler Tool Co., W. M. | 322 |

ORDER NOW... for PROMPT DELIVERY!

Increased production now enables us to make exceptionally prompt delivery of THE CINCINNATI Electrical Tools. You can plan now to have your needs served quickly.

A. BALL BEARING PEDESTAL GRINDER—Designed and built for continuous production work and all general purpose grinding. Sizes: Up to 15 H.P.

B. BUFFING AND POLISHING LATHE—Especially designed, ruggedly built, for continuous service under most severe conditions. Sizes: Up to 15 H.P.

C. TOOL POST GRINDER—With or without feed, especially adapted for grinding lathe centers, cutters, reamers, rolls, dies, etc. Can be used in shaper or planer for surface grinding. Sizes: $\frac{1}{4}$ to 1 H.P.

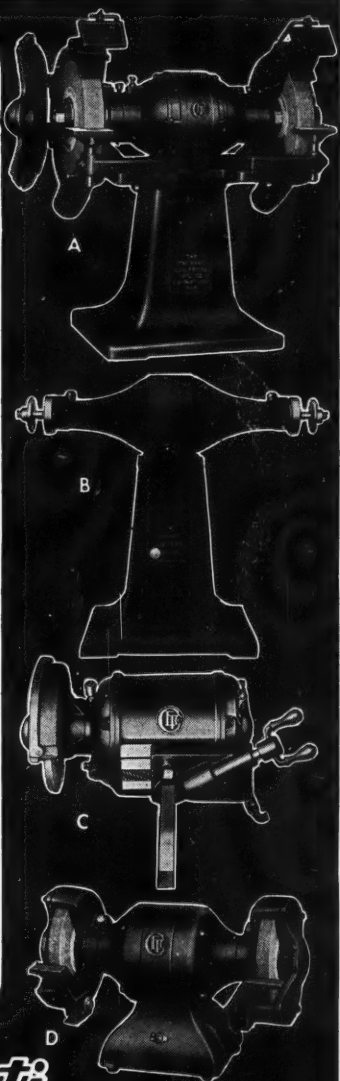
D. BENCH GRINDER—Powerful—ball bearing equipped. For all kinds of grinding and general purpose buffing and polishing. Sizes: 6, 7, 8, 10, and 12 inches.

WRITE TODAY FOR COMPLETE DETAILS

WE MANUFACTURE

Tappers
Routers
Nut Setters
Speed Lathes
Screw Drivers
Electric Drills
Aerial Grinders
Tool Post Grinders

Abrasive Cut-Off
Machines
Bench and Pedestal
Buffers
Air Master
Dust Collectors
Bench and Pedestal
Grinders



TRADE

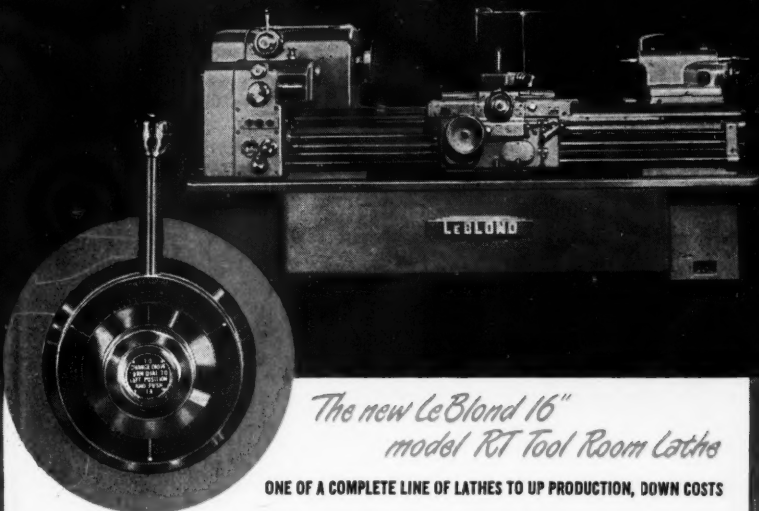
The Cincinnati

MARK

THE CINCINNATI ELECTRICAL TOOL CO.

Division of THE R. K. LeBLOND MACHINE TOOL CO.

2625 MADISON ROAD • CINCINNATI 8, OHIO



*The new LeBlond 16"
model RT Tool Room Lathe*

ONE OF A COMPLETE LINE OF LATHES TO UP PRODUCTION, DOWN COSTS

You get a total of over 300 spindle speeds, 6 to 1500 rpm, in this newest LeBlond tool room lathe. Within any one of three ranges you can select over 100 speeds without stopping the spindle. This fast, easy method of obtaining speeds materially increases tool room production.

The universal power rapid traverse which moves car-

riage, cross slide, and tailstock electrically; the totally enclosed quick change box which offers five different types of 60 threads and leads each; the combined feed apron . . . are but a few of the many LeBlond engineering advances which make the Model RT a 'must' in the modern tool room. For complete information, send for Bulletin RT-30 today.

CHECK ----- **CLIP** ----- **MAIL TODAY!**

Dept. D

THE R. K. LEBLOND MACHINE TOOL CO., MADISON AND EDWARDS BDS., CINCINNATI 4, OHIO

Gentlemen: ☐ Please send me complete set of bulletins.

Please send me the bulletins I have checked below:

- ☐ 16" Model RT Heavy Duty
- ☐ Heavy Duty Engine
- ☐ 16" Model RT Tool Room
- ☐ Dual Drive
- ☐ Hollow Spindle
- ☐ Sliding Bed Gap

- ☐ Regal
- ☐ Regal Attachments
- ☐ Electric Contouring Device
- ☐ Rapid Production
- ☐ Automatic Crankshaft
- ☐ Cutter Grinder

NAME

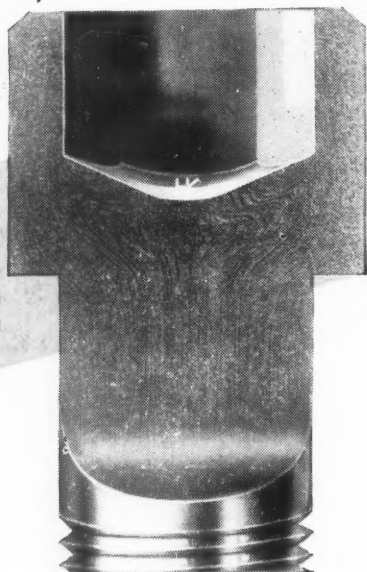
COMPANY

STREET

CITY ZONE STATE

LEBLOND

UNRETOUCHED PHOTO ETCHED CUTAWAY
HOLO-KROME SOCKET HEAD CAP SCREW

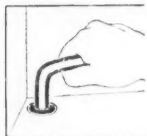


*Completely
Cold Forged*

QUALITY

Exclusively Holo-Krome! Continuous Fibres running from end to end — uninterrupted, unbroken and unsevered! Accomplished exclusively by the Holo-Krome patented method of Completely Cold Forging and sold through Holo-Krome Industrial Supply Distributors under the registered trade mark name "FIBRO FORGED" Socket Screws . . . Specify "Holo-Krome" and get these guaranteed unfailing performance Socket Screws.

INTERNAL WRENCHING



... THE BETTER
FASTENING METHOD

THE HOLO-KROME SCREW CORP.
Hartford 10, Conn., U. S. A.

HOLO-KROME

fibro forged

INTERNAL
SOCKET  **SCREWS**
WRENCHING



24
FIBRE
FIBRES
upted,
ed ex-
meth-
d thro
buto
name
pecify
nteed

RP.

S